THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[Registered as a Newspaper.]

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GAS PURIFICATION
BY
OXIDE OF IRON.

COOKE BROS.,
CENTRAL DEPÔTS:
CO. DONEGAL, IRELAND;
LONDON DEPÔT:
BLACKWALL, E.;
OFFICES:
26, 27, & 28, FENCHURCH ST.,
LONDON, E.C.

GENUINE TORBAY PAINT
And SPECIAL GASOMETER PAINT.
Several Prize Medals. Established over 20 Years.
These Paints are now used in over 200 Country Gas-Works, and by all the London Gas Companies, on Gasholders, Scrubbers, Purifiers, &c. Also used by the Admiralty, War Office, Railway Companies, Founders, &c. They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations; do not crack, blister, or flake off; will cover tar effectually.
The covering powers are considerably greater than those of any other Paint.—*See "Engineer," Nov. 2, 1866.*
Supplied, mixed ready for use, or in paste, as desired.
TORBAY PAINT COMPANY.
Proprietors: STEVENS & CO.,
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Works: BRIXHAM, TORBAY.

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BROOKFIELD GAS APPARATUS WORKS,
103, ICKNIELD STREET EAST, BIRMINGHAM.
CONTRACTOR FOR
LAYING MAINS
FOR
Gas, Water, & Sanitary Purposes,
AND MANUFACTURER OF
WOOD GRIDS
FOR
SCRUBBERS AND PURIFIERS.

COWEN'S PATENT FIRE-CLAY RETORTS.
JOSEPH COWEN and CO.,
BLAYDON BURN, BLAYDON-ON-TYNE,
Were the only parties to whom a Prize Medal was awarded at the Great Exhibition of 1851, for "Gas-Retorts and other Objects in Fire-Clay," and they were also awarded at the International Exhibition of 1862, the Prize Medal for "Gas-Retorts, Fire-Bricks, &c., for Excellence of Quality."
J. C. and Co. have been for many years the most extensive Manufacturers of Fire-Clay Retorts and Fire-Bricks in the Kingdom. Orders for Fire-Clay Retorts of all shapes and dimensions, and to fit any shaped Mouthpiece, Fire-Bricks, and every other article in Fire-Clay, are promptly executed at their Works as above.
COWEN'S GARESFIELD COALS.
Jos. Cowen & Co. are the only Manufacturers of Fire-Bricks and Clay Retorts at Blaydon Burn.

JOHN RUSSELL & CO.,
LIMITED,
Established at the commencement of Gas Lighting,
Manufacturers of
TUBES AND FITTINGS.
THREE PRIZE MEDALS,
Paris, 1878.
Head London Office:
145, QUEEN VICTORIA STREET.
ALMA TUBE-WORKS, WALSALL;
OLD PATENT TUBE-WORKS, WEDNESBURY.

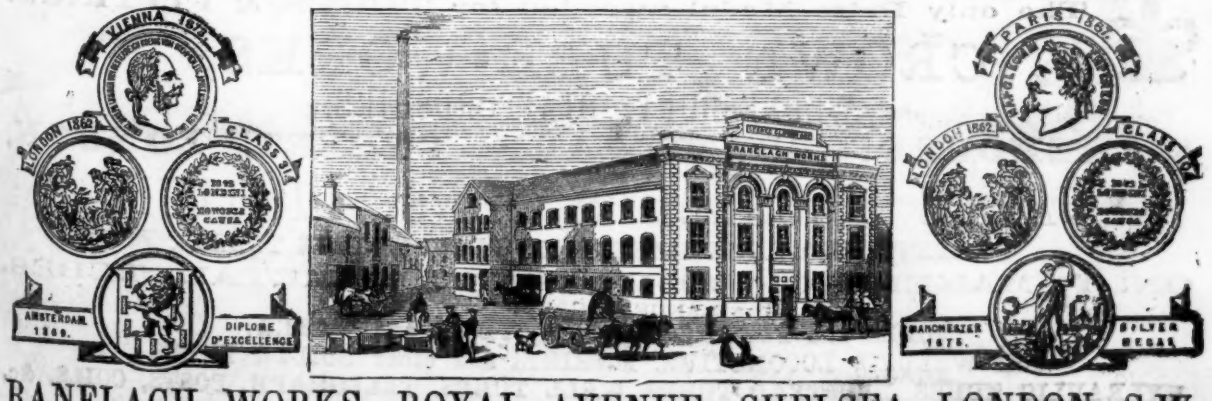
JOHN BENT & SON,
BELL BARN ROAD, BIRMINGHAM,
Manufacturers of
WET AND DRY GAS-METERS,
Licensees and Manufacturers of
HUNT'S
PATENT COMPENSATING METERS,
STREET-LAMPS, &c., &c.
Established 1830.

THOMAS PIGGOTT & CO.,
SPRING HILL, BIRMINGHAM,
Manufacturers of
TELESCOPIC & SINGLE GASHOLDERS,
CAST & WROUGHT IRON TANKS FOR DITTO,
And Gas Apparatus of every Description.
Marine, Tubular, Cornish, Plain, Furnace, Saddle, and Range Boilers.
Sugar, Saltpetre, and all kinds of Pans.
Roofs, Girders, and Bridges, and General Smith's Work.
London Offices: 97, CANNON STREET—
JAMES E. & SAMUEL SPENCER, Agents.

THE
"OTTO" GAS-ENGINE.
See Page 426.
CROSSLEY BROTHERS,
MANCHESTER AND LONDON.

THE
DUKE OF HAMILTON'S
LESMAHAGOW
CANNEL COAL.
AGENT:
JAMES M'KELVIE,
HAYMARKET,
EDINBURGH.
ESTABLISHED 1840.

CHANGE OF ADDRESS.
GEORGE GLOVER AND CO.,
DRY GAS-METER MANUFACTURERS,
HAVE REMOVED TO MORE EXTENSIVE PREMISES:



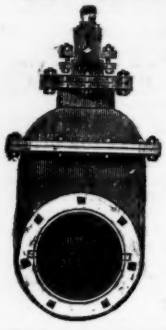
RANELAGH WORKS, ROYAL AVENUE, CHELSEA, LONDON, S.W.

WELLINGTON TUBE WORKS,

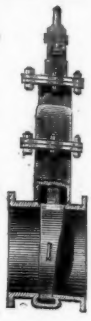
GREAT BRIDGE, TIPTON, STAFFORDSHIRE.

JOSEPH AIRD,

GAS, STEAM, AND HYDRAULIC TUBES AND FITTINGS.



C. & W. WALKERS' DOUBLE-FACED GAS-VALVES.



These solidly constructed double-faced Gas-Valves have taken the place of the old system of the light, single-faced disc, which is too uncertain and unreliable in large bores.

They are guaranteed absolutely gas-tight. They are very massive and rigid, and by improved modes of manufacture they are produced at very little excess in cost over the old light, weak system, which is liable to spring and bend, and become leaky.

The Valve is a rigid wedge of solid cast iron, having two perfectly scraped surfaced facings fitting between the two on the body, which are also surfaced.

A spring in two short halves, and, therefore, not liable to break, is used only for scraping the front facing clean.

The front facing is vertical; the back facing forms the wedge.

At a slight additional expense both flanges are faced to bolt to main-pipes.

MIDLAND IRON-WORKS,

DONNINGTON, near NEWPORT, SHROPSHIRE; 8, FINSBURY CIRCUS, LONDON.

EDWARD E. CROMBIE & CO.,

INVENTORS AND PATENTEES

OF THE

FRICTIONLESS DRY GAS-METERS,

Beg to intimate to Gas Companies and others that they are now prepared to supply these very superior Meters at the same prices as for the ordinary Gas-Meters.

In the construction of this Meter, for which the best tin plates only are used, every mechanical contrivance has been taken advantage of successfully to reduce the friction to a minimum, which is amply proved by the fact that they are made to work upon only one-fortieth of an inch pressure. By an improvement also in their construction, a steadier light is obtained, and greater capacity than can be got from any other Meter in the market. No gas can pass under the valves on any back pressure, as is the case with many other Dry Meters.

To Gas Companies supplying gas through streets with heavy gradients, these Meters are invaluable, as much gas is saved from the low pressure required to work them.

ALL METERS ARE UPHELD FOR FIVE YEARS.

METROPOLITAN WORKS, DIANA PLACE, EUSTON ROAD, LONDON, N.W.

SAMUEL CUTLER & SONS,

CONTRACTORS FOR GAS & WATER WORKS, GENERAL ENGINEERS, IRONFOUNDERS & MANUFACTURERS OF

GASHOLDERS, TANKS, PURIFIERS,

SCRUBBERS, VALVES, EXHAUSTERS, IRON ROOFS, BRIDGES, BOILERS, AND GENERAL CAST AND WROUGHT IRON WORKS.

S. C. & SONS undertake the entire erection of New, or Remodelling of existing Gas-Works in any part of the World, including small Works for MANSIONS, FACTORIES, &c., or Works of the largest extent (are now constructing the largest Gasholder yet erected); also the supplying and laying of MAINS.

They make a speciality of supplying every requisite whatever for Gas-Works, keeping in Stock what are most in request. WOOD SLEVES for Purifiers and Scrubbers, of a superior make.

SPECIAL CASTINGS to Drawing or Pattern at Shortest Notice.

Manufacturers of MORRIS & CUTLER'S PATENT CONDENSER & CUTLER'S PATENT GAS-WASHER.

DESCRIPTION OF MORRIS & CUTLER'S PATENT CONDENSER.—The Condenser may consist of pipes arranged in tiers, or in any other form most convenient to the site available, each tier being connected with special connections, and containing within same either one or more coils of smaller pipe through which water is passed, being supplied from any convenient source of supply, the water passing in an opposite direction to the gas, so that the coldest water is at the gas outlet. The power of the Condenser can be regulated precisely in proportion to the quantity of water allowed to pass through, which is not in any way contaminated, but simply heated by the hot gas, and advantage can be taken of its being at a high level to carry it to a high-level cistern, from whence it can be used for supply to boiler or any other purpose. The Condenser itself may form the support for a high-level cistern. By an arrangement of valves the water may be shut off, and an air orifice opened, when air will pass through instead of water, or both air and water can be shut off. The power of the Condenser is, therefore, entirely under control. The Condenser may be seen in operation at the Brentford Gas-Works.

For further Particulars, apply to Mr. F. MORRIS, GAS-WORKS, BRENTFORD, or to S. CUTLER & SONS, PROVIDENCE WORKS, MILLWALL (Near the Steamboat Pier), LONDON, E.

TRADE MARK.

THE MEDAL FOR 1862.

The only Prize Medal awarded for TUBES & FITTINGS.

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WAREHOUSE: SOUTHWARK STREET, LONDON.

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PATENTEES & FIRST MAKERS OF WROUGHT-IRON TUBES,

ONLY MAKERS OF HOMOGENEOUS METAL TUBES.

MANUFACTURERS OF

TUBES and FITTINGS for GAS, STEAM, and WATER;

LAP-WELDED, LOCOMOTIVE, MARINE, and other BOILER TUBES;

HYDRAULIC TUBES, BEDSTEAD TUBES, WELL TUBES, TELEGRAPH POSTS, COILS, &c.

GAS-FITTERS TOOLS, VALVES, COCKS, &c.

THOMAS PIGGOTT & CO.,

(Established 1822,)

SPRING HILL, BIRMINGHAM.

MANUFACTURERS OF

TELESCOPIC & SINGLE GASHOLDERS,

CAST & WROUGHT IRON TANKS FOR DITTO;

PURIFIERS, CONDENSERS, SCRUBBERS, RETORTS, VALVES;

IMPROVED WROUGHT-IRON RETORT-LIDS, CROSS-BARS, & SCREWS;

AND GAS APPARATUS OF EVERY DESCRIPTION.

SOLE MANUFACTURERS OF LIVESEY'S PATENT GASHOLDER MAN-LID,

By use of which Man-lid, inlet and outlet pipes can be examined and cleansed without loss of gas in crown of holder, or ingress of atmospheric air.

ROOFS, GIRDERS, BRIDGES, AND BOILERS OF ALL KINDS.

Drawings, Specifications, and Estimates supplied on application.

LONDON OFFICES: 97, CANNON STREET—JAMES E. & SAMUEL SPENCER, AGENTS.

HONOURABLE MENTION. **J. E. WILLIAMS & CO.,** PARIS EXHIBITION, 1878.

SOLE MANUFACTURERS OF THE

SPECIAL METALLIC OXIDE PAINT,

Largely used by Gas Companies, Corporations, Railway Companies, Ironfounders, and Machinists. It has the following qualifications and properties:—

EFFECTUALLY PREVENTS AND ARRESTS CORROSION.
HAS A FINE GLOSS, AND IS VERY DURABLE.
DOES NOT REQUIRE DRIERS LIKE OTHER PAINTS.
PROTECTS IRON FROM ACTION OF WATER.

IS NOT AFFECTED BY SULPHURETTED HYDROGEN.
FORMS A VERY HARD TOUGH (NOT BRITTLE) SURFACE.
WILL NOT CRACK, BLISTER, OR SCALE
IS NOT AFFECTED BY EXTREMES OF TEMPERATURE.

COVERS NEARLY DOUBLE THE AREA OF OTHER PAINTS.
(7 gallons or 1 cwt. will cover 1211 square yards of Ironwork.)
IS CHEAPER AND MORE ECONOMICAL THAN ANY OTHER.

VICTORIA PAINT WORKS, COLLYHURST, MANCHESTER.

HYDRATED PURIFYING MATERIAL.

Samples on application.

MESSRS. SPENCE BROS., LIMITED,

Will be glad to supply the above on the most favourable terms, and to treat, by Purchase or Exchange, for Spent Oxide.

PRICES ON APPLICATION.

ALSO PATENT DRY COPPERAS FOR EXTRACTING AMMONIA.

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ROBT. DEMPSTER & SONS,

GAS ENGINEERS, IRONFOUNDERS, AND CONTRACTORS,

ROSE MOUNT IRON-WORKS, ELLAND, YORKSHIRE.

MANUFACTURERS OF EVERY DESCRIPTION OF

GAS APPARATUS;

CONTRACTORS FOR THE

ERECTION OF PUBLIC AND PRIVATE GAS-WORKS.

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DANIEL HOWARD,

(Successor to the late BENJ. WHITEHOUSE),

GASHOLDER AND BOILER WORKS,

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MANUFACTURER OF

TELESCOPIC AND SINGLE GASHOLDERS,

WROUGHT AND CAST-IRON TANKS FOR DITTO.

PURIFIERS, CONDENSERS, SCRUBBERS, HYDRAULIC MAINS, AND ALL KINDS OF GAS APPARATUS.

WROUGHT-IRON ROOFS, BRIDGES, GIRDERS, ETC.

STEAM, HOT WATER, AND RANGE BOILERS, TANKS, CISTERNS, BOATS,

AND ALL KINDS OF WROUGHT-IRON WORK.

Drawings, Specifications, and Estimates supplied on application.

GAS PURIFICATION

BY

OXIDE OF IRON.

GAS PURIFICATION & CHEMICAL Co., LIMITED,

PALMERSTON BUILDINGS, OLD BROAD STREET, LONDON, E.C.

JOHN WM. O'NEILL, Managing Director.

THE WIGAN COAL & IRON COMPANY,

LIMITED,

DISTRICT OFFICE: 97, NEW STREET, BIRMINGHAM; AGENT: W. M'GOWAN,

Supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, &c.

N.B.—The Wigan Coal and Iron Company, Limited, are exclusive owners of the well-known HAIGH HALL AND KIRKLESS HALL GAS COAL COLLIERIES.

GAS COAL. GAS COAL. GAS COAL.

WELLS, BIRCH, RYDE, and CO., Limited,

HOYLAND SILKSTONE COLLIERIES,

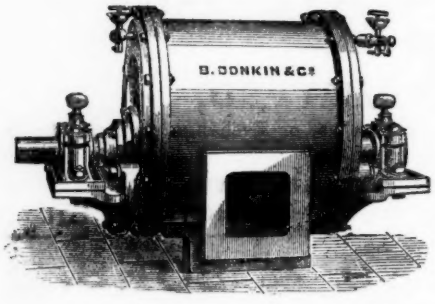
Near BARNSLEY.

This Company is now in a position to raise **2000 tons per day of REAL OLD SILKSTONE GAS COAL.**

"The quality of this Coal for Gas purposes, if equalled, is not excelled by any on record, and the Coke competes successfully with best Durham."—See *Mining Journal*, Aug. 11, 1877.

Prices quoted to any Railway Station, or F.O.B. Hull, Grimsby, Goole, Keadby, Liverpool, and Fleetwood.

Full particulars will be sent on application to above address.



J. BEALE'S

NEW PATENT GAS-EXHAUSTERS,

For the Manufacture of which

MESSRS. B. DONKIN & Co.

POSSESS THE SOLE RIGHT.

Made with two Outside Bearings and with all the Latest Improvements.

FULL PARTICULARS ON APPLICATION.

BERMONDSEY, LONDON, S.E.

Messrs. B. D. & Co. are also Manufacturers of Steam-Engines and of Improved Gas and Water Valves, &c., &c.

GOLDSMITH'S PATENT SIGHT WATER-LINE INDICATING GAS-METER.

MANUFACTURED BY GUEST AND CHRIMES,

FOUNDRY AND GENERAL BRASS WORKS, ROTHERHAM;

AND 85, SOUTHWARK ST., LONDON, S.E.

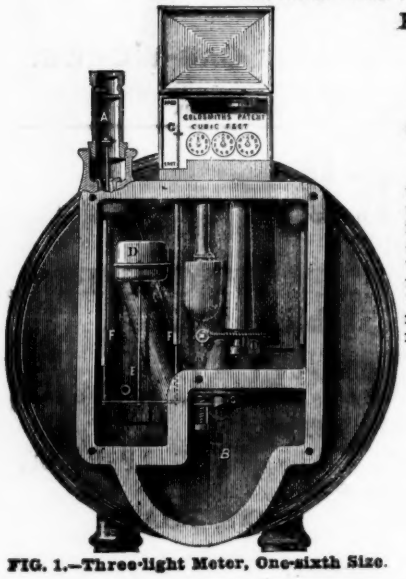


FIG. 1.—Three-light Meter, One-sixth Size.

Fig. 1 is a Meter with front removed to show the arrangement and connection of the Indicator and Valve.

Fig. 2 is front view of Index, with cover up.

The principal object of this invention is to render the water-line in the reservoir at all times visible. It will be seen, by reference to the illustrations, that this is accomplished in the following manner:—On the dial are the words "Open" and "Shut," and attached to the float is the pointer G, which rises and falls with the water-line in the reservoir. If the pointer is at "Open," it shows that the valve is open, and that the reservoir is full. If it is at "Shut," it shows that the reservoir is empty, and that the gas will be shut off.

The following ADVANTAGES will be obvious:—

1. The Inspector can see at a glance if the Meter requires water.
2. No more water than is required need be added, and therefore no water has to run out.
3. The Meter Inspector will be spared a great deal of his most objectionable work, and he will save a great deal of time and trouble.
4. The consumer will not always have to be asked for water, nor will he have to endure the unpleasant smell caused by waste water being run out.

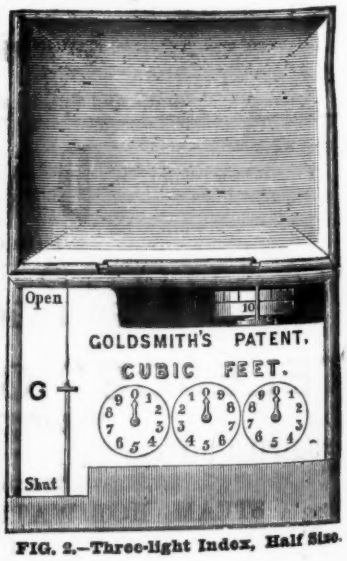


FIG. 2.—Three-light Index, Half Size.

GEORGE ORME & CO.,

ATLAS METER-WORKS, OLDHAM,

MANUFACTURERS OF

WET AND DRY GAS-METERS,

STATION-METERS, GOVERNORS,

PRESSURE AND EXHAUST REGISTERS,

LAMP-METERS IN CAST-IRON BOXES,

And every Description of Gas Apparatus.

JAMES MILNE & SON,

GAS ENGINEERS,

Gas-Meter, Gas Apparatus, and Gas-Fittings Manufacturers,

EDINBURGH, AND

2, KING EDWARD STREET,

NEWGATE STREET, LONDON.

Meter Works in London—2, CROSS STREET, WILDERNESS ROW, E.C.

STATION-METERS GOVERNORS, CONSUMERS METERS, GAS LUSTRES, CHANDELIERS, BRACKETS, &c.,

And every description of Gas-Fittings and Gas Apparatus.

LONDONDERRY GAS COALS

DIRECT FROM THE

MARQUESS OF LONDONDERRY'S COLLIERIES.

COUNTY OF DURHAM.

For Prices and Particulars, apply to

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London Agents: Messrs. LAMBERT BROS., 85, GRACECHURCH ST., E.C.

J. & H. ROBUS,

BUILDERS AND CONTRACTORS

FOR THE ERECTION AND REBUILDING OF GAS AND WATER WORKS,

RETORT-SETTING—A SPÉCIALITÉ.

ROBUS'S IMPROVED RETORT-SETTINGS, guaranteed to Carbonize a large amount of Coal with a small per cent. of Fuel.

ESTIMATES GIVEN FOR MAIN-LAYING.

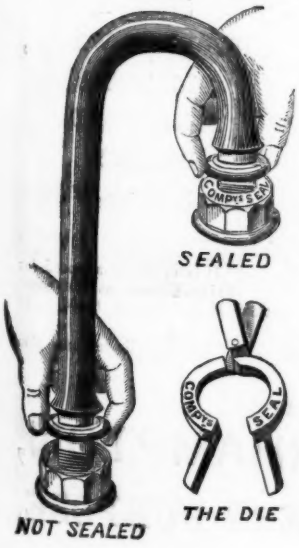
N.B.—All kinds of Fire Goods and Gas Apparatus supplied on the shortest notice.

Address:—J. & H. ROBUS, BELL GREEN, CATFORD, LONDON, S.E.

FOULGER'S PATENT

COUNTER-SUNK SEAL GAS-METER UNIONS,

As Supplied to The Gaslight and Coke Company.



These Unions practically place a Gas Company's property under lock and key, by rendering it impossible to disconnect at any joint at which gas could be obtained unregistered, without destroying the Company's seal or signature, whilst a small cover absolutely protects the impression from accidental injury.

A meter having been fixed with one of these Unions on the main-cock, and another on the inlet, a few pinches of specially prepared crushed sealing-wax is placed in the cup, and being melted with a blow-pipe, the wax runs between the reversed threads, the circular tong-shaped die will then give a sharp impression of the Gas Company's title, an operation requiring about two minutes in all to perform.

If heat is applied for the purpose of unsoldering the joints, the wax is instantly fused, and the impression, of course, lost.

Are supplied in all sizes, either as Caps and Linings or Barrel-Unions, and at a small additional cost over existing connections.

For further Particulars, Samples, &c., apply to the Sole Agents,

WIGGINS & RIHLL,

VICTORIA DOCK ROAD, LONDON, E.

C. & W. WALKER'S

WOOD PURIFIER SIEVES,

Which have now been used for fifteen years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

MIDLAND IRON-WORKS,

DONNINGTON, NEAR NEWPORT, SHROPSHIRE.

FINSBURY CIRCUS, LONDON.

THOMAS CARR & SON,

MANUFACTURERS OF

FIRE-BRICKS, LUMPS, TILES, RETORTS, &c.,

COTSWOOD FIRE-BRICK WORKS, SCOTSWOOD-ON-TYNE.

Also Makers of all kinds of Common Building Bricks, and of Pressed White and Red Bricks for Facing.

ESTABLISHED IN 1850.

BENJAMIN CARPENTER,

THE ORIGINAL MANUFACTURER OF THE IMPROVED

WOOD SIEVES

FOR

GAS PURIFIERS & SCRUBBERS.

PROVIDENCE WORKS,

22, HERMES STREET, PENTONVILLE ROAD,

LONDON, N.

The Dunston Engine Works Co.,

GATESHEAD-UPON-TYNE.

Are the Sole Manufacturers of

Archer's Patent Hoists,

ALSO OF

Archer's Patent Stone Breaker,

AND OF

Archer's Patent Ore Crusher & Pulveriser,

The last-named Machine (without the Pulveriser) makes the best and most durable Coke Breaker.

JAMES OAKES & CO.,

ALFRETON IRON-WORKS, DERBYSHIRE,

AND

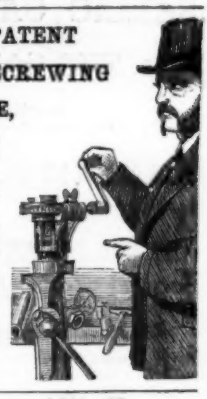
WENLOCK IRON WHARF, 21 & 22, WHARF ROAD, CITY ROAD, LONDON, N.,

Manufacture and keep in stock at their works (also a large stock in London) PIPES and CONNECTIONS 1½ to 48 inches in diameter; and make to order Retorts, Purifiers, and Tanks, with or without planed joints, Columns, Girders, Special Castings, required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Syphons and Covers are joint-faced if required, doing away with millboard and iron boring, or Syphons made without Covers, a socket being cast on and fitted with a small plug about 6 inches in diameter with lead joint. In either way preventing leakage.

GRIRDROD'S PATENT

PORTABLE PIPE SCREWING MACHINE,



For 1 in., 1¼ in., 1½ in., and 2 in. Gas Threads, complete £7 10s.

In use at the chief gas-works, and giving great satisfaction.

For other useful goods, see Bailey's "Illustrated Inventions," post *free* 3s. 6d.; gratis to ledger customers.

W. H. BAILEY & CO.,

Brassfounders, Gauge Injector and Tool Makers,

ALBION WORKS, SALFORD,

LANCASHIRE.

Gold Medal Awarded, Paris Exhibition, 1878.

THOMAS TURTON AND SONS,

SHEAF AND SPRING WORKS,

SHEFFIELD,

MANUFACTURERS OF

FILES OF BEST QUALITY

FOR ENGINEERS,

STEEL OF ALL DESCRIPTIONS,

SCREW STOCKS, TAPS, AND DIES, SPANNERS,

RATCHET BRACES, LIFTING-JACKS,

ANVILS, VICES,

AND ENGINEERS TOOLS GENERALLY.

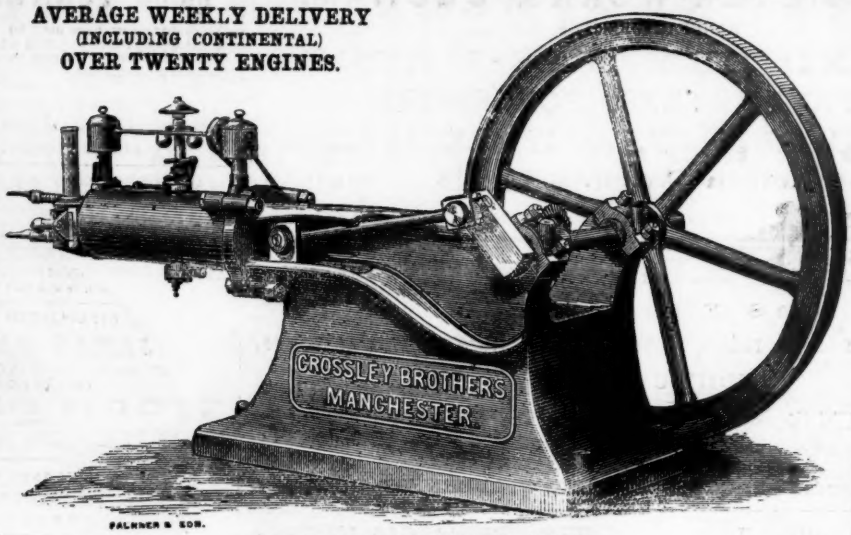
LONDON OFFICE:

90, CANNON STREET, E.C.

AN ENGINE WHICH WORKS WITHOUT A BOILER OR STEAM

The durability of these Engines is now established by experience, one of them having run night and day at the Hinckley Gas-Works for over Twelve months without any expenditure for repair; this being equal to about 2½ years average work.

AVERAGE WEEKLY DELIVERY
(INCLUDING CONTINENTAL)
OVER TWENTY ENGINES.



PALMER & SON.

Over 1900 already delivered.

Very numerous Testimonials from Users, including Engineers, Men of Science, and others, on application to the makers.

No trouble with Coal, Ashes, Smoke, Insurance, Water, or constant attendance.

No Glands to pack, or Water Gauges and Steam Gauges to watch.

STARTS AT A MOMENT'S NOTICE.

THE "OTTO" SILENT GAS-ENGINE.

(Otto and Crossley's Patents, 1876 and 1877,)

THEY ARE USED FOR ALL KINDS OF PURPOSES, CHIEFLY FOR EXHAUSTERS, SCRUBBERS, & PUMPS.

DELIVERED IN MANCHESTER. SIZES { NOMINAL HORSE POWER ½ 1 2 3½ 6 8 12 16 / MAXIMUM HORSE POWER ¾ 1½ 2½ 4 9 12 18 24 } OFFERED. CASES NOT CHARGED IF RETURNED FREE

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THE "RELIABLE" STEAM-PUMP

IS NOW IN USE AT NEARLY ALL THE

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THE GASLIGHT AND COKE CO., BECKTON NEW WORKS (24 supplied),
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THE PHŒNIX GAS CO. and COMMERCIAL GAS CO., LONDON,

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CARLISLE,
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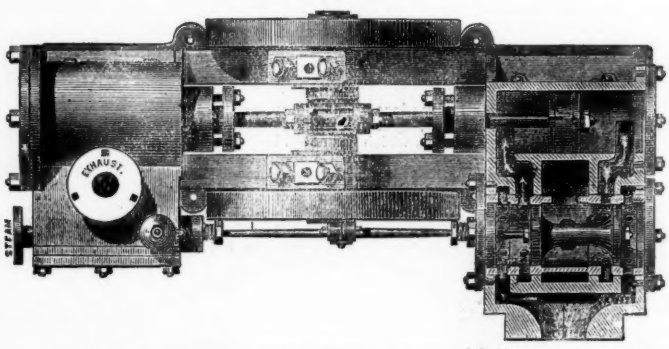

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and other Gas-Works.

The "RELIABLE" is undoubtedly, by means of its Piston Valve, the best Pump made for Gas-Works use. It is specially adapted for pumping TAR, OILS, AMMONIACAL LIQUOR, &c., and is the ONLY Pump that will do so SUCCESSFULLY and at the same time discharge double the quantity of liquid. The "RELIABLE" is the only Pump manufactured that is REVERSIBLE, and therefore is invaluable in frosty weather.

J. E. & SONS IMPROVED "RAM" STEAM-PUMPS, which are made with both Single and Double Rams and Steam Cylinders, are also admirably adapted for Gas-Works use.

For Price Lists and Testimonials, apply to the Sole Makers and Patentees,

JOSEPH EVANS & SONS, WOLVERHAMPTON,

MAKERS AND PATENTEES OF

PUMPS AND PUMPING MACHINERY FOR EVERY PURPOSE.

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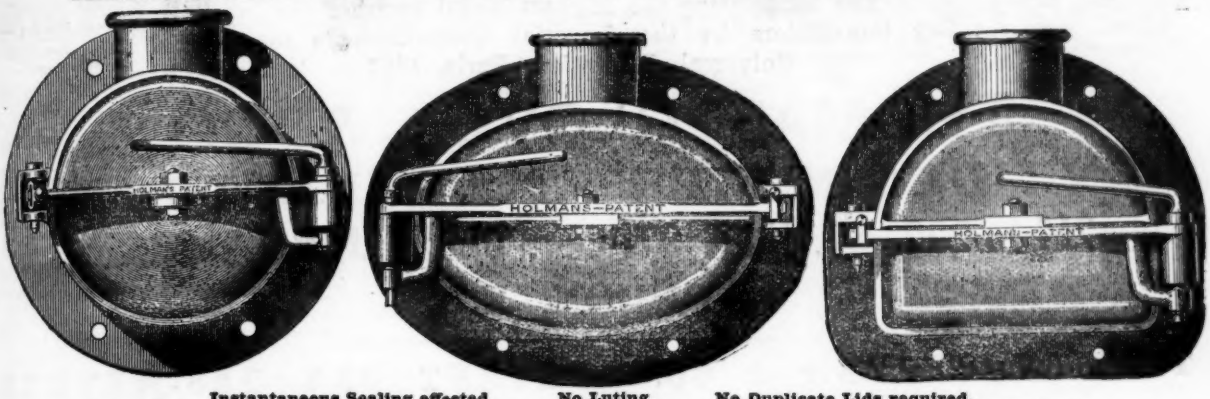
(LATE OF 10, LAURENCE POUNTNEY LANE.)

SOLE MAKERS OF MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH HOLMAN'S PATENT ECCENTRIC FASTENINGS,

Anti-Friction Catches, and New Self-Adjusting Cross-Bars.



Instantaneous Sealing effected. No Luting. No Duplicate Lids required.

Holman's New Self-Sustaining Cross-Bar ensures freedom of Joint, and maintains parallel position of the Lids.

Since their introduction in 1869, these Patent Retort-Lids have been thoroughly tested, being now in use in nearly all the principal Gas-Works in London and the Provinces.

T. B. and H. are now making the "Morton's Self-Sealing Lid" of the SAME FORM OR SECTION AS THE RETORT (see Illustrations above), as well as bringing the Mouthpiece from the D or Oval at back to Circular in front, as heretofore.

D and Oval Morton's Lids are working satisfactorily both in this country, on the Continent, and in the United States of America. Among others they have been adopted by the following Gas-Works:—

The Gaslight Company's Works, Fulham; Ditto, Bromley-by-Bow; Ditto, King's Cross; Ditto, Shoreditch.
And also in the Gas-Works at Richmond, Maidstone, Gloucester, Glasgow, Portsea, Roubaix (France), The Hague (Holland

HUNT'S PATENT EQUILIBRIUM GAS-GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown in the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the holder can be placed at an convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.

These Governors have been adopted by many leading Gas Companies, among whom are the following:—

The Gaslight and Coke Co. (9), The London Gas Co. (3), and at Abergavenny, Arundel, Birmingham, Cannes (France), Devonport, Dursley, Exeter, Guernsey, Halesowen, Mentone (France), Monmouth, Newcastle-on-Tyne, Oxford, Plymouth, Rochdale, Windsor, &c.

TESTIMONIAL.

The Gaslight and Coke Company,
9, Water Street, New Bridge Street,
Blackfriars, E.C., Feb. 27, 1875.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

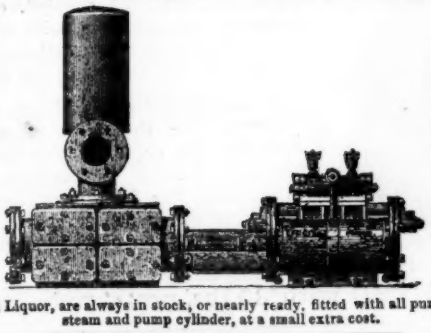
Yours truly,

(Signed) JOHN JOHNSON.

PRICES AND FULL PARTICULARS ON APPLICATION.

THE "SPECIAL" STEAM-PUMP.

Diameter of Steam Cylinder.	Diameter of Water Cylinder.	Length of Stroke.	Gallons of Water per Hour, Approximate.	Reduced Prices.
3	1½	9	450	£16
4	2	9	815	18
5*	2½	12	1,250*	21
5*	3	12	1,830*	22 10
4	4	12	3,250	25
6*	4	12	3,250*	30
5	5	12	5,070	32 10
7*	5	12	5,070*	40
6	6	12	7,330	40
8*	6	12	7,330*	50
7	7	12	9,750	50
10*	7	12	9,750*	65



In use in a Hundred Gas-Works in the United Kingdom for Pumping Ammoniacal Liquor, Water, or Tar.

Messrs. Burt, Boulton, and Haywood, Manufacturing Chemists, have over FORTY "Special" Steam-Pumps in use at their several large Tar-Works.

Two Hundred Sizes made. Those in Table opposite are the leading Sizes for use in Gas-Works and Chemical Works.

* These Sizes being usually selected for pumping Tar and Liquor, are always in stock, or nearly ready, fitted with all pump details in iron, and extra length distance-piece between steam and pump cylinder, at a small extra cost.

TANGYE'S HIGH-PRESSURE AND CONDENSING STEAM-ENGINES; CORNISH, VERTICAL, & TUBULAR BOILERS; HYDRAULIC AND SCREW LIFTING-JACKS, CRABS, PULLEY-BLOCKS, &c.

FULL PARTICULARS, ESTIMATES, CATALOGUES, ETC., ON APPLICATION.

London, 1851. New York. 1853. Paris, 1855. London. 1862.

Dublin, 1865.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters bv the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

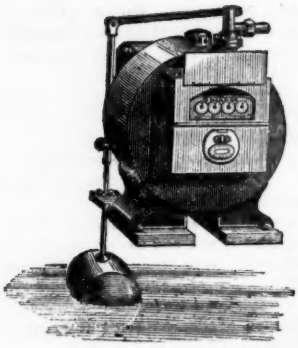
LONDON, E.C.

THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS.

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON AND CO.

(ESTABLISHED 1816.)



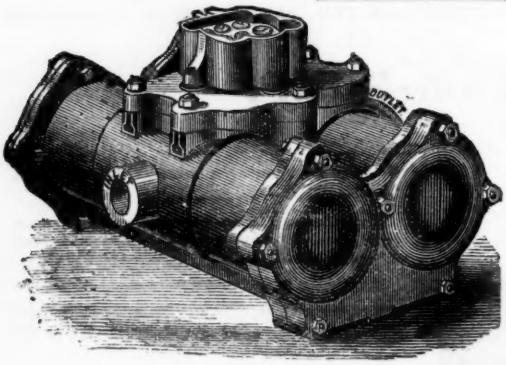
SOLE MAKERS OF THE LOW-PRESSURE WATER-METER.

This Meter will register with perfect accuracy, either at full speed, or with a few drops only passing through it.

It must be placed over the cistern to be supplied, and the water, after being measured, will fall from the outlet into the cistern below.

Each Meter is fitted with a ball-valve, so made that it can be adjusted to shut off the supply at the inlet when the water reaches any required height in the cistern.

The 100-gallon Meter is fitted with a cistern holding about three or four gallons, and may be fixed inside a house, free from the effects of frost, and requires no attention after once being fixed.



HIGH-PRESSURE WATER-METER.

The Union Water-Meter, of which an external view is here given, is of the positive class—*i.e.*, a Meter in which a measuring chamber is alternately filled and emptied, each filling being duly recorded. It is formed of two cylinders, with double pistons in each, having a rotary-valve of peculiar construction, which is worked from cams on the piston-rods.

It is claimed for this Meter, among its advantages over other Piston Meters in use, that it is extremely small and compact, and that its durability and accuracy have been proved by the fact that upwards of 20,000 of them, of various sizes, are in successful operation in the States. In England the instrument has been fully tested by several Water Engineers of eminence, and pronounced by them as a reliable and satisfactory register of water supply; it is also economical in cost.

ALL METERS are TESTED with 60 lbs. pressure before they are sent out.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

CONTENTS.

	PAGE
Circular to Gas Companies:—	
Amalgamation in South London	429
Report of the Crystal Palace District Gas Company	429
Exhibition of Gas Apparatus at Greenock	429
An Experiment in Street Illumination at Bristol	429
Discontinuance of the Improved Street Illumination in Sloane Square	430
Meeting of the Dover Gas Company	430
Meeting of the Hastings and St. Leonards Gas Company	430
Meeting of the Brighton and Hove Gas Company	430
Manchester District Institution of Gas Engineers—	
Mr. Hutchinson "On the Estimation of Sulphur Compounds"	430
Mr. Chew "On Distributing Apparatus"	430
Water and Sanitary Notes:—	
The Health of London and the Water Supply	430
Local Government Board Inquiry at Colchester, *re* the Purchase of the Water-Works by the Corporation	430
The Sewerage of Rochdale	431
East Molesey and the Lower Thames Valley Sewerage Scheme	431
The Sewerage and Drainage of Dublin	431
Communicated Article:—	
A Lesson from Germany. "By Isca"	431
Correspondence:—	
Unaccounted-for Gas	432
Legal Intelligence:—	
High Court of Justice—Chancery Division—Davis *v.* Isle of Thanet Gaslight and Coke Company	432
Miscellaneous News:—	
Reduction in the Price of Gas at Belper	431
Barton-on-Humber in Darkness	431
Liverpool Engineering Society	431
Folkestone Gas Company	432
Reduction in the Price of Gas at Nelson	432
Metropolis Gas Supply	433
Metropolis Water Supply	433
Poole Water Supply	433
Manchester District Institution of Gas Engineers	433
Electric Lighting at Liverpool	435
Sale of Gas and Water Shares at Folkestone	435
Meeting of the Dover Gaslight Company	435
Meeting of the Brighton and Hove Gas Company	436
The Purchase of the Derby Water-Works by the Corporation	436
Meeting of the Hasting and St. Leonards Gas Company	436
Meeting of the Port Elizabeth (Cape Colony) Gas Company	436
Meeting of the Lewes Water-Works Company	437
Extension at the Salford Corporation Gas-Works	437
Stockton and Middlesbrough Corporation Water Supply	437
The Purchase of the Colchester Water-Works by the Corporation	438
Tamworth Water Supply	438
The Disposal of the Sewage of Rochdale	439
Trade Reports	439
Exhibition of Gas Apparatus at Greenock	440
Brampton Gas Company	441
Reduction in the Price of Gas at Shrewsbury	441
Glasgow Corporation Gas Supply	441
A Wind-Mill Pump for Gas-Works	441
Ackworth Gas Company	441
Experiment in Street Lighting at Bristol	442
Improvements at the Southampton Gas-Works	442
East Grinstead Gas and Water Company	442
The Purchase of the Cardiff Water-Works by the Gas Corporation	442
Bath Gas Company	442
The Halifax Corporation and the Supply of Gas to the Out Townships	442
Shoreham Water Company	442
The Liverpool Corporation (Vyrnwy) Water Scheme	442
The Use of Paraffin Oil for Street Lighting	443
Register of Patents:—	
Froud, T.—Flexible Valves for Gas-Mains	443
Longshaw, J.—Gas Tap	443
Wilson, J. G.—Carburetting Gas	443
Kirkham, Hulett, and Chandler—Condensing, Washing, and Purifying Gas	443
Simon, H.—Gas Motor Engines	443
Penney, J.—Ferrule Taps, &c	443
Sugg, W. T.—Purifying Gas	444
Jordan, C.—Joints for Pipes or Tubes	444
Wright, F.—Governors for Gas-Burners	444
Wallace and Christopher—Purification of Gas	444
Thomas, H.—Gas-Meters	444
Livesey and Kidd—Combustible Gas	444
Applications for Letters Patent	445
Patents which have passed the Great Seal	445
Patents which have become void	445

TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, SEPTEMBER 16, 1879.

Circular to Gas Companies.

We have, unfortunately, no news to present to our readers respecting the projected amalgamation in South London. It is known that the South Metropolitan and the Surrey Companies have combined, to the very great advantage of the Shareholders in the latter Company and their consumers. These will each receive an immediate benefit. The one by an increased dividend, the other by a large reduction in the price of gas. To the consumers, other benefits are certain to follow; and as regards Shareholders, we know perfectly well that extended operations and low-priced raw material must of necessity bring to them an enhanced dividend. Future developments of the combinations will probably result in a more extended system, which must contribute to the general advantage of the Companies concerned. Further than this, we can say no more to-day; but, as remarked before, there are matters on the *tapis* which may result in a very much larger combination. The negotiations on all these matters are, of necessity, conducted with much secresy, and we are unable to say whether or not the Directors of the Phœnix Company have replied to the invitation of the South Metropolitan Company. It is almost impossible to believe that any but one response will be sent. The circumstances of the Phœnix Company are such that some immediate action—parliamentary or other—must be taken to keep them going. Now, the South Metropolitan Company have capital, which could carry on the United Companies for some years. The Phœnix Company going to Parliament would obtain a relatively small amount of capital, to be sold by auction, and a low initial price. In every way, then, their interests lie in combination, and we hope in our next issue to be able to announce that the sensible course has been resolved upon to join the southern combination.

[Since the above was written, we have heard that the terms offered to the Phœnix Company by the Directors of the South Metropolitan Company have been accepted with so slight a modification that it is exceedingly unlikely any disagreement will take place.]

The report and balance-sheet of the Crystal Palace District Gas Company has been issued. It is needless to say that the Company are in a very prosperous state. The accounts show that the balance of net revenue, after paying full dividends on all classes of shares and stock, will leave an amount of £1292 to be carried forward. All the works are in excellent condition. The new holder is completed and ready for use; and, in fact, everything for the future looks *couleur de rose*. The new Act of the Company will confer upon them advantages which will presently be felt in a marked degree. We fully anticipate that, after a year or so of its working, an increased dividend will be paid. Nothing at all is said in the report about the sale of coke, but we know that as a rule it is quick in the Crystal Palace Company's district, and they have at the present time a relatively small stock on hand. The make of gas last half year was good, and the sale excellent.

Greenock comes late, but will not, we hope, be last in a display of apparatus intended to teach the use of gas for other than illuminating purposes. Gas cooking-stoves we may say are now the rage all over the country. If Mr. Stewart, M.P., as stated by him at the opening ceremony in connection with the exhibition, reported in another column, has experienced any discomfort from the use of gas in cooking his viands, we are certain that the fault lay with the cook, and not with the apparatus. We believe we are right in stating that in all the large clubs in London gas is exclusively employed. Our correspondent informs us the Argyle Ironmongery Company, of Glasgow, exhibit cooking stoves that are largely used in the cooking depôts established in Glasgow for the working classes, and with excellent effect. Messrs. Leoni, of London, of course, come out in force. This firm can make stoves and apparatus which will cook, at a cheap rate, 100 lbs. and more of meat a day; while their little "Nonpareil" stove will enable a family to cook all their meals at a cost which may be considered merely nominal.

This exhibition in Greenock is certain to be productive of great advantage to the Corporation. Relatively speaking, the consumption of gas in the borough is large, but it may be greatly increased by the use of gas for purposes which have not hitherto engaged the attention of the consumer. Coal is cheap in Greenock, but even the consumer who lights a fire to cook his herring will find an advantage in employing gas instead of coal. It only takes a match to light gas; it takes a bundle of sticks to get a coal fire alight, and we are perfectly certain that in the long run even the Scotch consumer, with a rather dear gas and cheap coal, will find it to his advantage to use the gaseous products of the coal in preference to the coal itself.

Various attempts have been made to improve street illumination by the use of optical arrangements. The prevailing idea seems to be that by some combination of optical apparatus the amount of light from a given source of gas illumination may be enormously increased. We need hardly say that nothing of the kind can possibly happen; the gas gives its light, and distribute it how you will that light cannot be increased in quantity. The last experiment in this direction was made at Bristol, where, last week, the Borough Surveyor placed between two bat's-wing burners a convex lens. The effect of this may be readily guessed—a great display of light up and down the street; no increase in the roadway or under the lamp irons—in fact, a total failure so far as to effect any improvement in street lighting. We are sorry for this, because we do not feel certain that optical arrangements may not in the end produce a very useful effect; at present we do not see any apparent. The trial of the bull's eyes, in Sackville Street, proved a ridiculous failure; but the experiment in Bristol is

much more promising. The lens will require to be most carefully adjusted, and, what is more, the lens will require to be ground and focussed with much accuracy. It is not sufficient that an ordinary convex lens should be stuck up and left to produce its effect; an especial lens, or, rather, many lenses, must be constructed. Then comes the difficulty of focalizing on windy nights. Altogether we are inclined to think that street illumination had better be left to the Gas Companies.

While on the subject of street gas illumination, we may mention that the London Company have for some time had one of Sugg's burners in the lamp at Sloane Square, which, as a matter of course, was supplied gratuitously. At a recent meeting of the Chelsea Vestry it was a question as to whether the lamp should be continued at the expense of the ratepayers. Of course, it was decided that it should not, so this part of Sloane Street will continue to remain in comparative dullness. We must confess that we are sorry for that unfortunate man, the metropolitan ratepayer. But there is no help for him, pay or live in semi-darkness he must.

The half-yearly meeting of the Dover Gas Company was held on the 2nd inst. The Company find themselves placed in an excellent position, and are able to pay seven and a half per cent. per annum on the ordinary shares, and carry over a balance of £3037, a portion of which is devoted to payment of back dividends to Shareholders in 1863. The legality of this payment we shall not, of course, attempt to dispute, but we may here remark that hard times may not be very distant, and a good reserve is a better security to Shareholders than the payment of back dividends for distant years. The Dover Company do very well, and it must be said that the prices realized for the shares recently sold by auction indicate that they stand well in public estimation.

The Hastings and St. Leonards Gas Company held their annual meeting on the 4th inst. The balance-sheet showed a net profit of £4574, which enabled the Directors to pay a dividend of 10 per cent. on the £25 shares, and 7 per cent. on the £20 shares, and left a balance of £937 to be carried forward. In this case, as in that we just mentioned, considerable additions have been made to the works. Those in the former instance are nearly finished, and will presently be in operation. The additional purifying works of the Hastings Company will soon be completed, no doubt to the comfort of the Hastings people, though they do not, so far as we know, complain of the present condition of affairs. Hastings gas is well purified; and, except for extensions, additional purifying works are not very necessary.

The half-yearly meeting of the Brighton and Hove Gas Company was held on the 5th inst. The Company's operations during the past half year have been very successful. They are able to pay maximum dividends on all classes of shares, and carry forward a large balance. An additional source of gratification to the Proprietors was the Act they obtained last session, which will indubitably confer very great benefits on the Company.

The Manchester District Institution of Gas Engineers had a very successful meeting at Barnsley on the 30th ult. After a neat introductory speech by the President, Mr. T. Newbigging, C.E., the real business was commenced by the reading of a paper by Mr. Walter Hutchinson on "The Sulphur "Compounds in Coal Gas," and the various means for estimating them. We have more than once remarked in these columns that it would be extremely valuable to have comparative experiments illustrating the value of the several instruments in use for the determination of what is now known as "sulphur." Mr. Hutchinson thinks that no other sulphur compound than carbon-bisulphide is determined by the combustion of gas; but we think he is mistaken. When gas is burned for the sulphur test, we believe that all the sulphur compounds are consumed. How complete was the list of apparatus experimented with by Mr. Hutchinson will be seen by a simple enumeration of them. We have the Referees, Letheby's, Wright's, Marriott's, and Harcourt's. Mr. Hutchinson did, indeed, experiment with some other forms of apparatus, but of these we have only short records. It must, of course, be understood that the gas used in the experiments was all taken from the same stock; and, keeping this in mind, the results obtained by the different instruments are very interesting. Except in one instance, there is hardly an approach to uniformity in the results obtained. This is with Harcourt's test, in which five examples only showed a range from 9·00 to 9·50 grains. With Marriott's instrument the range is much greater—viz., from 7·61 to 12·63 grains. With Wright's apparatus we have a closer approximation to regularity of results; thus in eight experiments the estimations only range from 5·11 to 8·81 grains. With Letheby's apparatus we have a little more concordant results; the range in nine experiments is only from 6·16 to 7·83 grains. The results with the Referees tests vary but little—viz., from 8·67 to 10·31 grains of sulphur in 100 feet. We must say that we are struck by these differences, relatively small as they are, but showing that the estimations of sulphur in different instances may vary from 5·11 to 12·63 grains. If the matter were of the smallest importance, which it is not, we should say that a more perfect instrument is required for the determination of sulphur in gas. While, therefore, we advocate the most complete purification possible, we think the appliances now in use show with sufficient accuracy the amount of determinable sulphur left behind. A chemist would, of course, with a combustion apparatus, estimate it with the closest accuracy; but this is not what is wanted for commercial purposes.

The paper by Mr. Chew, on "The Distributing Apparatus, "from the Gasholder to the Consumer's Burner," was a very instructive one, and afforded the members much gratification. It must be admitted that the author is very favourably circumstanced to carry out whatever ideas he conceives. A double service of mains is a luxury which few gas supply undertakings can afford. As regards leakage, Mr. Chew is also favourably situated for its repression, and we are glad to see that he is so successful in keeping it down. Other Managers, like Mr. Hutchinson, of Barnsley, whose mains lie in soil which is continually sinking, will thank Mr. Newbigging for his suggestion of vulcanized india-rubber joints. The vexed question of the comparative value of wet and dry meters of course cropped up, and seems to have been settled at the meeting in favour of the wet. As concerns the control over internal fittings, Mr. Chew is exceptionally fortunate. Gas Companies and gas-making Corporations are exposed to much discredit, in consequence of the stupidity and ignorance of the plumbers and gas-fitters; and we hope the day will soon come when sufficient control will be exercised from the retort to the burner, to give the Manager an absolute veto upon every tube and fitting.

Water and Sanitary Notes.

UNHAPPILY the health of London does not keep up to the promise it gave a short time since. The death-rate returned last week to an average which seems to indicate that in the course of a few weeks it will again be at its normal amount. We do not regard this as any serious matter, for it will simply go back to the average of the past thirty-three years, leaving cholera years out of the question. The report of Dr. Frankland on the condition of the Metropolitan Water Supply last month is much as usual. It stands to reason that the quality of the water supplied by the Tottenham Local Board, the Kent Water Company, and the Colne Valley Water Company was all that Dr. Frankland considers desirable; but that the condition of the water supplied from the Lee and the Thames was not so satisfactory. The Thames water is, in fact, reported to have been in August abnormally bad in quality. So bad indeed, that the supplies of five Companies are said by Dr. Frankland to have been wholly unfit for dietetic purposes. Living and moving organisms were stated to be abundant in the water of the East London and Grand Junction Companies, both of whose waters were slightly turbid. It is well to know that under these dreadful circumstances London continued in such a healthy state. The alarmist reports produce no effect. The water supply of London will remain what it is for very many years. It may not be all that is desired, but it is infinitely preferable to a soft water supply from the north, or to a harder supply from the chalk wells. No doubt a change in our supply is impending, the nature of which cannot at the present moment be guessed; but we may be certain that, for years to come, the Thames will furnish the water supply of London; and we venture to think that, if proper care be taken, no better supply is to be found in the kingdom.

The Town Council of Colchester have applied to the Local Government Board for power to borrow £60,000, to complete the purchase of the water-works. Unluckily, there was no one connected with the Corporation who could tell the Inspector appointed to hold an inquiry into the circumstances of the case, exactly what the water-works would cost. The inquiry was, in fact, held prematurely. Arbitrators are to meet in a short time, and determine the exact value of the works; but until this has been done, no definite conclusion can be arrived at as to their worth, and the Local Government Board will only sanction a loan for a definite sum. It is estimated that the value of the undertaking will not exceed £60,000, and it was this sum that the Town Council asked permission

to borrow. It is perfectly well known that the value of the undertaking concerned, together with ten per cent. for compulsory purchase, will closely approach the £60,000, and it is a mere piece of red tapeism to refuse the Council power to borrow this sum. The effect will only be to keep the Company a little longer out of their money, and to leave less freedom to the Town Council, who are anxious to push on with certain alterations. The Arbitrators, it is reported, will make an award about November next, and then we shall know the exact value set upon the works, and the precise sum the Town Council may borrow.

Rochdale is also in the market to borrow money. After boasting for years of the success of their dry sewage scheme, they are now about to set up a sewage farm, for which they require £112,000. The sewage is to be conveyed by gravitation into clarifying tanks 5 acres in extent; and, after passing over 15½ acres of land to be used for irrigation, it will finally get into the Roach, let us hope in a savoury condition. We regret very much the failure of the dry system at Rochdale, with which, at one time, we were greatly in favour; but—

> "The best laid plans of mice and men
> Gang aft a gley,
> And leave us nought but grief and pain
> For promised joy."

And so it happens that, after expending a large amount of money on the dry-closet system, the Rochdale Town Council have to go to the Local Government Board to borrow £112,000 to carry out an irrigation scheme.

East Molesey was once a happy village. Every house had its cesspool, and every good house had water supplied by the Lambeth Water Company. Each cottage, also, we may suppose, had its own well, from which it drew all the water it required, pure or impure. It was probably close to the cesspool, but, notwithstanding this, the death-rate in the village only amounted to 12 per 1000. In an evil day it occurred to certain gentlemen to create a scheme for the drainage of the Lower Thames Valley district. This, as it happened, involved the institution of a large irrigation farm in the parish of East Molesey. The inhabitants rebelled, and the occupants of the surrounding villas and neighbouring property have not fallen in with the views of the Board constituted by the Act of 1877. It is unfortunate that this collision of authority should have taken place. The memorial which the East Molesey Board now propose to present to the Local Government Board, distinctly sets forth that the land bought by the Thames Valley Main Sewerage Board for irrigation purposes is totally unfit for the object, and they pray that the Board will not consent to any further confirmation of the powers of the Local Authority.

The City of Dublin continues in an exceptionally unhealthy state, which has at last attracted the attention of the Supreme authority, and we find that a Royal Commission is to be issued to inquire into the sewerage and drainage systems of the City. These eminently require attention; but still, it is curious to note how healthy the better districts in Dublin are. It is no matter, however; for the whole drainage system of Dublin requires a radical reconstruction, with most copious additions. These, it seems, it is now proposed to make, and we hope that nothing will stand in the way of a general reform. The estimates for the works which have been projected amount to £450,000, and the tenders received vary from £1,100,000 to £700,000. But how is the impecunious Corporation of Dublin, with little money and less credit, to raise these large sums? If the Government will guarantee the amounts, all must go well; but supposing they will not, the interest at 4¾ per cent.—at which the money must be raised—may not be paid for years to come.

Reduction in the Price of Gas at Belper.—The Directors of the Belper Gas Company, at their meeting last Tuesday, resolved to reduce the price of gas, from and after the 1st of January next, from 5s. to 4s. 6d. per 1000 feet, subject to certain discounts.

Barton-on-Humber in Darkness.—The *Leeds Mercury* reports: "The Local Board of Barton-on-Humber and the Gas Company of that town are at present at loggerheads in consequence of the Board refusing to pay the charges of the Company for lighting the street lamps, on the ground that the price is exorbitant. The price paid by private consumers is 5s. 10d. per 1000 feet, 10d. per 1000 being remitted to cash customers. The result of this refusal is that the town is without gaslight at night and in total darkness."

Liverpool Engineering Society.—The first meeting of this Society after the summer recess was held last Wednesday—Mr. Morgan E. Teatman, M.A., in the chair. A paper was read by Mr. E. C. V. Petherick "On Pumps and Pumping Gear," which was extensively illustrated by a series of diagrams. The author described the various classes of pumps, their construction and maintenance, and the necessary qualifications of pump valves for various purposes, their design and arrangement; also the air-vessels, stand-pipes, rods, and other gear necessary for pumping, whether from mines or for town supply.

Communicated Article.

A LESSON FROM GERMANY.

By "Isca."

In a former article I have ventured to mention a few points of divergence between the practical working of the British Association of Gas Managers and its cousin, the German Gas and Water-Works Managers Society. One of these was the predominance of independent research among the members of the British Association, as contrasted with the system of organized committees for combined labour, which is so much favoured in Germany. It is impossible to deny that the latter arrangement possesses many advantages which are deficient in the other. With us, a number of papers on every conceivable subject are read before an assemblage of men, gathered for that occasion from all parts of the kingdom, bound together by considerations of common interest, and with minds stored by the teachings of similar experiences, but comparative strangers to each other's particular acquirements and modes of thought. Hence the matter of every communication is always more or less of a surprise to the majority of the auditors, who, in the event of a subsequent discussion arising on the subject of a paper, can only bring to bear on the elucidation of any debateable points the general observations suggested on the spur of the moment. These, though sometimes pertinent, are more frequently trivial; are chiefly of value in further proving the depth of the reader's research into his subject; and rarely provide additional information of substantial value, except where the critical remarks come from those who happen to have studied the matter for themselves.

In all individual effort of this nature there is, moreover, a tendency to confound the personality of the contributor with the subject of his labours. It will generally be observed that the fact of "So-and-so having read a clever paper" on something is remembered, when the contents of the paper are very hazily retained, if at all. In such a case the subject suffers, rather than profits, by the eminence of the contributor, not less than where a truly interesting and important question is cast into reproach by the "drivelling incompetence of What's-his-name," by whose fault or misfortune of slipshod diction, or bad delivery, all respect for his work is drowned in sneers at himself.

And again, supposing that the treatment of a subject in a paper is such as to impress any other person with the conviction that he knows too little about it, and he forthwith searches into it for himself after the meeting; he may possibly gather knowledge which would have been most useful at the time, but which (the initiative being in other hands) he does not care to dress up into a paper for the next meeting, and so either keeps it to himself, or, if he be of an aggressive nature, makes an attack on the other man in letters to the Journal; he, of course, replies, and the merits of the affair are lost in the battle which ensues.

Without making mention of the countervailing merits of our system, which no one appreciates more strongly than the writer, let us see how the foregoing drawbacks are avoided by the system of Commissions of the whole House, or of certain selected members, after the foreign plan.

In the first place, suppose that a suggestive paper on any subject is produced, and such an amount of interest and importance is shown to be attached to it by the writer and his impromptu critics as to be expressed in a general desire to know more about it. Then a selection is made of such as are deemed most able and willing to make a thorough inquiry into it, and the assemblage disperses with the knowledge that they have not heard the last of it, but that any remarks they may have made thereon will receive every consideration, and that any points they may raise or further information they may obtain, will be gratefully received and carefully attended to by the Commission, and that, when the final report is brought up at the next or a subsequent meeting, their remarks will have all the weight of matured reflection, and will be duly esteemed as confirming or qualifying the conclusions of the Commission. Thus, the definite increase of knowledge finally attained rests not on the dictum of one man alone, but on the combined testimony of witnesses whose observations have checked and strengthened each other, and therefore the discredit or jealously attending a solitary experimenter—perchance personally obnoxious to some of his fellows—can never prejudice the result of labours bearing on their face the guarantee of impersonality. Hence the subject becomes and remains the chief and only thing to be regarded, and the various facts so ascertained appeal to the mind with an authority not otherwise attainable.

It is but reasonable to admit, that the interest of a number of men belonging to one profession being thus powerfully directed into channels which they and their leaders have decided to be of paramount importance, the probabilities of a general advancement of knowledge are thereby greatly increased. Many men will think and work to good purpose if they are awakened to a sense of what to think and work about, when, if compelled to strike out a line for themselves, they would shrink before the apparent preoccupation of every path of science and art, forgetting that in experimental research, more than in anything else, it is the will that finds the way, and that he who will only look earnestly enough into the commonest and most hackneyed subject will always see in it something which has escaped all other eyes than his. Indeed, instances are not wanting in which minds of a high order of originality and power have invested simple objects with a charm of novelty and interest which the most startling discoveries have in many cases failed to possess. (Faraday's immortal disquisitions on a candle form a case in point.) But the power which such an exercise calls forth is also equal to great investigations into the dim possibilities of science, and as such is given to but few. Such men, and such men alone, can form a school, and do

so whenever they discover an unsuspected application of the immutable principles of the life of the universe. Thereupon arises a host of commentators and followers who indite treatises without end, and besiege the Patent Offices of the world with their subordinate ideas, some of which may, and frequently do eventually prove of inestimable value in adapting and popularizing the original discovery, before which, however, none of them could have arisen. These well-marked waves of inventive effort following a leading principle, with which we are all familiar, illustrate the fact of many men's ability to follow, although unable to lead. Let the idea be started, and it will speedily be examined at all points and be made the most of. Hence the probability that more and better work will be done by many independent observers pursuing a common end, as in the German method, than when an equal number are overweighted by the obligation on each to strike out his own line without knowing, after all his toil, whether it will prove to be worth the trouble, or whether some other may not have already worked it out before him.

It seems probable also that this uniform direction, and universal participation in research, tend to raise the whole of the members of any society which adopts it into a generally elevated level. Any new process or improved method instantly becomes known in all its details to every member, without so much probation and filtering through the quicker apprehension of a few leading minds, whose *imprimatur* perhaps eventually leads to its adoption by others who are content to have the initiative taken for them as a matter of course. This, which is very much our way of doing things, has the demerit of dilatoriness. If a novelty promising great things, but perchance arousing suspicion by its revolutionary appearance, ever does win its way over our innate conservatism, it is only by the individual daring of a few influential men, who, relying on their own perspicacity, take it under their protection, and thence, in the course of a few decades, it becomes disseminated over the country. But, meanwhile, what will the British Association of Gas Managers have had to do with it? Perhaps it has been touched upon in a few inaugural addresses, and formed the subject of a solitary paper; but, beyond this, any one who wants to know what is going on must inquire for himself elsewhere. Anything like the full and impartial information resulting from an investigation by a working committee, or the authoritative opinion of such a body, revised by the members in council, and expressed in the united voice of the society, must not be expected.

Take, for instance, the question of heating retorts by gas-generator furnaces, which has made such headway on the Continent. Has anybody asked himself the question why it is that there is practically no interest taken in this matter in England; or so little known about it, which means the same thing? The testimony of gas engineers in Germany and France is almost unanimously in favour of them, and, that this has not been without careful inquiry, the records of experiments without number, and discussions at every meeting reported in the German and French gas journals, amply prove. Proof also of the favour in which they are held is given in the great variety of their design. The number of gas engineers who have invented modifications of these furnaces is very considerable, and their admirers are many and clamorous; but, without following any of them into the grounds of their praises of this or that design, it is to be noted that they all agree in the opinion freely expressed, "that any engineer who would in the present day construct furnaces on the old-fashioned model would be acting most detrimentally to the interest of his employers." Is this the verdict which must be passed upon the majority of British gas engineers?

The question may be asked, but it is more than doubtful if any satisfactory answer can be given with sufficient authority to settle the point. And this is where it seems to be fit subject for regret that the strength which the British Association of Gas Managers could wield in its corporate capacity is not exerted for the benefit of the members who could not individually spare the time or trouble necessary to come to a proper decision. If these furnaces do not perform all that is claimed for them by their advocates, how is their widespread and increasing adoption on the Continent to be accounted for? If they are so successful there, why do we not hear of their general construction here? If it is worth while to take advantage of their (alleged) economy in Germany, it must surely be so in England. When we find it stated that by their use at least 10 per cent. of fuel is saved, and the advantages of very regular heats and extraordinary diminution of wear and tear and labour are secured, we are tempted to ask in amazement whether these things are considered to be of no value in England, or if ignorance is the cause of our neglect? That the former is not the case, we may be well assured; and, therefore, the fault must be attributable to the latter. Let us by all means know the best and the worst that can be urged for and against these furnaces by the observation and experience of those whom we know, and who are most competent to judge between the old and the new. It is not by any means a light matter when we reflect on the enormous quantity of fuel which is represented by 10 per cent. of the consumption of the gas-works in our large towns alone. If there is any value still attaching to the old opinion that "profits are *made* in the retort-house, elsewhere money is only *saved*," it is high time that this matter should be sifted to the bottom. To not only neglect an improvement in manufacture, but to do so without being able to assign any reason for so doing, would be a symptom of mental torpidity which it would be extremely painful to witness in any class, especially in those whose position and privileges are not without assailants, eager to turn every appearance of sloth to their own advantage.

I do not wish to be understood as advocating any cessation whatever of separate and independent research; no one could possibly desire such extinction of the means by which all knowledge is really acquired. For the sum of the knowledge of many, combined or otherwise, is no more than the sum of the individual contributions of every component unit. It is not so much the possible initiatory attributes of a concrete body that are necessary, for, if it were, that would not be the kind of machine to provide them; the initiative must and will come from the individual mind, but it is afterwards that the labours of a committee of inquiry would commence, not to relieve the projector so much as to complete the work of investigation which he may indicate, but may be unable to follow up, and bring to an issue of general acceptance.

Nor would I maintain that nothing is to be accepted as proved, until it shall have passed through the hands of a board of examiners. That would be absurd; neither does every novelty require it. But the case in point is one of such general importance, so desirable if true, yet so revolutionary of aspect, and the means of proving it are so far beyond the reach of most inquirers, however willing, that it is matter for careful consideration whether or not we ought to take a leaf from our neighbour's book, and, by some such means as I have shadowed forth, provide the necessary information, so that whoever will act in that direction may, at least, go on the impartial statements of disinterested judges, and not run the risk of being misled by partial truths uttered by prejudiced or ill-informed partisans of either side.

Correspondence.

[*We do not hold ourselves responsible for the opinions expressed by Correspondents.*]

UNACCOUNTED-FOR GAS.

Sir,—Can any of your readers inform me why, if (in round numbers) my make of gas in either of the winter quarters is four million cubic feet and the unaccounted-for gas only 8 per cent., during either of the summer quarters my make is two millions and the unaccounted-for gas nearly 20 per cent.?

It might appear at first reading that such loss was due to overfilled holders; but such is not the case, as the capacity of my holders is 10,000 and 8000 cubic feet respectively, and they have only stored an average of 5000 and 4000 cubic feet respectively.

Could condensation alone account for so wide a difference?

A solution of the above difficulty will greatly oblige. Manager.

Legal Intelligence.

HIGH COURT OF JUSTICE—CHANCERY DIVISION.

Wednesday, Sept. 10.

(*Before Justice* Stephen, *Vacation Judge.*)

DAVIS *v.* ISLE OF THANET GASLIGHT AND COKE COMPANY.

This motion, the object of which is to restrain the Company from breaking up the plaintiff's land for the purpose of laying their pipes, has appeared in the list more than once, but has stood over in order to complete the affidavits.

Mr. Bagshawe, Q.C., who now appeared for the plaintiff, said he must again ask for it to stand over, as the affidavits filed by the defendants had, some of them, only just been put into his hands.

Mr. Chapman Barber, for the Company, said he must object to the motion standing over again, inasmuch as the plaintiff had taken the law into his own hands, by making a tunnel under the public highway between Birchington and Margate, and removing the defendants pipes. He read some correspondence which had passed between the plaintiff and the Secretary of the Company, in which the former had threatened to do so, if the pipes were not removed before a given time; and the Company had since found that the pipes in question did not convey gas, so that it was evident that he had carried out his intention.

Mr. Bagshawe said he did not know what the plaintiff had done, but if he had done anything wrong, he might be proceeded against in a separate action. It did not really affect his application for the matter to stand over to complete his case.

After some conversation it was arranged that the motion should stand over for a week, plaintiff undertaking not to interfere with the Company's pipes in the meantime, and the latter to be at liberty, without prejudice to any question, to repair the pipes if broken.

Folkestone Gas Company.—The half-yearly meeting of this Company was held on Monday, the 1st inst., when dividends at the rate of 10 per cent. per annum on the original shares, and 7 per cent. on the new 1876 shares, were declared. The Directors who retired by rotation were Mr. W. Fowle and Mr. H. Stock (the latter of whom had been appointed in the room of the late Mr. T. Cobb), and they were re-elected. Mr. F. S. Tolputt, the retiring Auditor, was also re-elected. During the half year Mr. C. Chapman was appointed the other Auditor, in the place of Mr. H. Stock, who had retired, after having held the office for upwards of 16 years. At the meeting it was stated by the Chairman (Mr. Richard Hart) that if the business of the Company continued to increase at its present rate, there would most probably shortly be a further reduction of 3d. per 1000 feet in the price charged for gas to consumers.

Reduction in the Price of Gas at Nelson.—At a meeting of the Nelson Local Board, on Friday the 5th inst., the Gas Committee recommended that the price of gas be reduced 5d. per 1000 feet, the reduction to take effect on and after the 1st of October. Mr. Walton, the Chairman of the Committee, said that this would make a difference of £400 in the revenue; but, against this, there would, no doubt, be an increased consumption at the lower price. Mr. Tunstill said he had nothing to urge against the reduction, only there was just the question as to whether the Committee were not making a mistake in not offering a discount. In Burnley they reduced the price of gas, but had considerable difficulty in collecting the money for it, so were now advancing the price in order to give the advance back as a discount to all who paid within a month. Mr. Marsden said he was in favour of a discount, but not the whole 5d. Mr. Whittaker moved that an extra 2½ per cent. be offered and allowed to all who pay their gas accounts within one month from the end of each quarter. He said he felt sure they could afford it, and be no losers by it. An amendment was proposed that a reduction of 4d. be made, and 2½ per cent. discount, but it was ultimately withdrawn, and Mr. Whittaker's motion unanimously adopted.

Miscellaneous News.

METROPOLIS GAS SUPPLY.

THE IMPROVED SYSTEM OF PUBLIC LIGHTING.—At the meeting of the Chelsea Vestry last Wednesday, Mr. Davidge asked the Surveyor (Mr. Stayton) whether the extra lighting at Sloane Square, introduced during the *furore* about the electric light, was paid for by the Gas Company. The Surveyor replied in the affirmative. Mr. Davidge said he hoped that single gaslights of great power would be more generally employed for the illumination of open spaces in the parish, and moved that the Surveyor be instructed to bring up a report as to the cost of maintaining the present gas arrangements at Sloane Square as a permanent thing. Mr. Alldridge seconded the motion. Mr. Dillon objected to it on the score of expense, and the motion was put and lost.

METROPOLIS WATER SUPPLY.

The Registrar-General publishes the following table of the average daily quantity of water supplied to London during August. According to the returns furnished by the Metropolitan Water Companies, 140,250,771 gallons, or 637,223 cubic mètres of water (equal to about as many *tuns* by measure, *tons* by weight) were supplied daily; or 247 gallons (112·2 decalitres), rather more than a *ton* by weight, to each house, and 34·8 gallons (15·8 decalitres) to each person, against 37·1 gallons during August, 1878.

COMPANIES.	Number of Houses, &c., supplied in Aug., 1878.	Aug., 1879.	Aver. Daily Supply of Water in Gallons* during Aug., 1878.	Aug., 1879.
Total supply	549,801	567,920	144,956,441	140,250,771
From Thames	259,032	270,925	72,204,470	71,426,320
„ Lea and other Sources	290,769	296,995	72,751,971	68,824,451
THAMES.				
Chelsea	29,014	29,700	8,870,300	8,921,600
West Middlesex	50,960	52,742	10,549,687	10,993,387
Southwark and Vauxhall	81,260	86,927	25,294,031	24,667,853
Grand Junction	38,462	39,648	12,787,652	12,344,180
Lambeth	59,336	61,908	14,702,800	14,499,300
LEA AND OTHER SOURCES.				
New River	127,127	128,709	31,091,000	28,902,000
East London	117,084	120,459	32,447,800	31,208,800
Kent	46,558	47,827	9,213,171	8,713,651

* Including that for manufactures and for various purposes other than for domestic consumption.

Note.—The return for August, 1879, as compared with that for the corresponding month of 1878, shows an increase of 18,119 houses, and a decrease of 4,705,670 gallons of water supplied daily.

The following is Dr. Frankland's report on his analyses of the Metropolitan Water Supply during August:—"Taking the average amount of organic impurity contained in a given volume of the Kent Company's water during the nine years ending December, 1876, as unity, the proportional amount contained in an equal volume of water supplied by each of the Metropolitan Water Companies, and by the Tottenham Local Board of Health, was—Colne Valley, 1·3; Kent, 1·6; Tottenham, 1·6; New River, 3·3; Lambeth, 5·0; East London, 5·3; Chelsea, 5·8; Grand Junction, 6·3; West Middlesex, 6·4; and Southwark, 6·5. The Thames water delivered by the Chelsea, West Middlesex, Southwark, Grand Junction, and Lambeth Companies was again so strongly polluted by organic matters as to be quite unfit for dietetic purposes; although, with one exception, all the Companies had efficiently filtered it. The exception was the Grand Junction Company who delivered slightly turbid water, containing abundance of moving organisms. The Lea water distributed by the New River Company was of much better quality, but that sent out by the East London Company was scarcely superior to Thames water; it was, moreover, slightly turbid, and contained moving organisms. The purity of the deep-well water delivered by the Kent and Colne Valley Companies and by the Tottenham Local Board of Health was still quite unaffected by the weather. It was, as usual, clear, bright, and of excellent quality for dietetic purposes. Seen through a stratum two feet deep, the waters presented the following appearances:—Kent, Colne Valley, and Tottenham, clear and colourless; New River, clear, very pale yellow; Chelsea, West Middlesex, Southwark, and Lambeth, clear, pale yellow; Grand Junction, slightly turbid, pale yellow; East London, slightly turbid, very pale yellow."

Results of Analyses expressed in Parts per 100,000.

Companies or Local Authorities.	Total Solid Matters.	Organic Carbon.	Organic Nitrogen.	Ammonia.	Nitrogen, as Nitrates and Nitrites.	Total combined Nitrogen.	Chlorine.	Total Hardness.
Inner Circle.								
Thames—								
Chelsea	28·90	·301	·041	0	·171	·212	1·4	22·7
West Middlesex	30·88	·315	·061	0	·144	·205	1·5	24·2
Southwark	30·30	·322	·060	0	·175	·235	1·4	23·6
Grand Junction	29·44	·326	·044	0	·148	·192	1·4	23·9
Lambeth	32·22	·263	·032	0	·190	·222	1·5	23·9
Lea—								
New River	30·48	·169	·025	0	·198	·223	1·5	23·9
East London	29·46	·269	·039	0	·128	·167	1·5	23·6
Deep wells—Kent	45·40	·087	·010	0	·459	·469	2·5	29·5
Outer Circle.								
Colne Valley	13·40	·067	·010	0	·375	·385	1·5	7·7
Tottenham Local Board	41·00	·087	·005	·113	0	·098	2·8	27·1
Corporation of Birmingham*	24·50	·311	·032	·005	·220	·256	2·0	14·7
Corporation of Glasgow†	3·04	·139	·017	0	·008	·025	0·65	1·1

* Analyzed by Dr. Alfred Hill, Medical Officer of Health and Analyst to the Borough.
† Analyzed by Dr. E. J. Mills, F.R.S., of Anderson's College, Glasgow.

Note.—The numbers in the analytical table can be converted into grains per imperial gallon by multiplying them by seven, and then moving the decimal point one place to the left. The same operation transforms the hardness in the table into degrees of hardness on Clark's scale.

POOLE WATER SUPPLY.—In reference to a paragraph which appeared, under the above heading, in the JOURNAL of the 26th of August, we have since learned that an offer of £20,000 was made by the Town Council to the Water-Works Company for their undertaking; but as the Company want £30,000, the Council decline to entertain the matter further.

MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.

(*Continued from page* 401.)

Mr. JOHN CHEW (Blackpool) read a paper on

THE DISTRIBUTING APPARATUS FROM THE GASHOLDER TO THE CONSUMER'S BURNER.

Mr. President and Gentlemen,—The subject which I have chosen for your consideration and discussion to-day is one of the first importance to a gas manager, both in regard to profitable working and the giving of satisfaction to the customers and the general public, who are the support of the undertaking.

It is of importance to the manager, because, if his mains and services are in bad order, he is handicapped very probably to the extent of 3d. or 4d. per 1000 cubic feet on all the gas that he sells, compared with his more successful neighbour in an adjoining town, whose distributing plant is in a satisfactory state. We all know that within a circle of 100 miles of this place there are works with a leakage of from 20 to 30 per cent.; whilst at others again the gas unaccounted for is as low as 4½ per cent. When a manager has to contend with heavy leakage, although it may not have been brought about during the term of his management, he will have many sleepless nights, and that incessant worry which gentlemen present can well understand—explosions, escapes into sewers—gas, in short, cropping up in all sorts of places where it is not wanted. I am not certain where the responsibility for escapes of gas, causing damage to life and property, begins and ends, as the law seems to indicate that a company is responsible for any damage caused by escaping gas until after it has passed through the consumer's meter. Regarded from any of these points of view, it is of the first importance that every manager should give his attention, and adopt the best means and appliances that are known amongst us, to accomplish so desirable an object as the reduction of leakage, and the distribution of the gas at as near as may be uniform pressure amongst the burners of his consumers. Bearing these objects in mind, I venture to offer a few remarks and suggestions gathered from my own experience, and trust they will evoke a good discussion, from which we shall all leave this meeting benefited. I take it for granted when the capital of a company is £600 per million feet made, that £200 is represented by the mains, services, and meters; at least, it is so in my own works.

If we lay down rules for regulating the size of the pipes for internal fittings—on which I shall have something to say further on—we ought ourselves to take care that we do not put pipes too small in the streets. For the sizes and lengths of street mains, I know of no better guide than the tables of the late Mr. Barlow, on consulting which you will find that at 1-10th pressure a

2-inch main at	50	yds. will deliver	540	c. ft.; at	500	yds.	170	c. ft. per hour				
3 „	„	„	100	„	„	1054	„	„	1000	„	333	„ „
4 „	„	„	100	„	„	2160	„	„	1500	„	557	„ „
6 „	„	„	250	„	„	3770	„	„	1750	„	1420	„ „
8 „	„	„	250	„	„	7760	„	„	1750	„	2920	„ „
12 „	„	„	500	„	„	15,100	„	„	2000	„	7550	„ „
					&c.,		&c.,		&c.			

These distances and sizes I have always found to work well in my own case. If a greater quantity of gas than 550 cubic feet is wanted, say, from a 4-inch main (distant from the next larger or feeding main 1500 yards), either you must have a larger main, or increase the pressure over the whole district to make up for the smallness of the pipe. The sectional area of the trunk mains, in my opinion, should always exceed the united sectional area of all the branch mains taken from it.

With reference to the laying of pipes, I have for very many years past used turned and bored joints, with a small cavity for filling with cement. I have never had any trouble worth mentioning with the joints being drawn. They are more easily laid than with lead, and much more reliable. I endeavour to lay the pipes so that the tops of them will be not less than 2 ft. 6 in. to the surface of the ground; and I always, where possible, lay them in the footways, and one on each side of the street where the street is wide, and built up on both sides. Some will say this is very costly. So it is, there is no doubt; but it is first cost only, and quite justifiable when you consider the crossing of the street for every other service-pipe, and that the sewer is generally in the middle of the street, where the settlements of the ground take place, drawing joints and breaking pipes; the gas escaping not at the top, but mostly running to the first vent, into the sewer, entailing great expense. Cast-iron pipes should be of good tough metal; I have known pipes that were of brittle iron snapped by the tipping of a load of coal in the street. The standard weights and sizes of pipes are generally to be relied on when the pipes are cast vertically in dry sand. I have for the last year or two ceased to use 2-inch pipes, although I have a very large quantity in the streets. What I have used of them, I have had made ⅝-inch thick, and weighing 28 lbs. per yard. This allows a proper strength of metal to get a good screwed thread for the service-pipe, for nothing is more common, when these pipes are light and thin, than for the main to break where the pipe is screwed into it. Another important matter is to have the holes drilled, not chipped, as is common amongst some old gas men, and the disadvantages of which latter practice I have had painful experience in past years. The objections to 2-inch pipes are several. First, the cost per yard of a 3-inch main will not exceed by more than 20 per cent. that of a 2-inch, and you have more than double the area for the circulation of gas through it. Again, if you tap a 2-inch main for a ¾-inch pipe, it is as much as you can do, for there is very little thread left on two sides of the pipe to make a good sound joint. Then, should you require a larger service than ¾-inch, how are you to get it, without cutting the main in two parts? These objections are both overcome by adopting the 3-inch main as the minimum size. I endeavour also to have as few blank ends of mains as possible. Further, I have a system of testing the pressure on the 20 miles of main in my district at 50 different points about twice a year. This is easily done by taking off the lamp-burners and putting on the gauge; and any engineer who adopts this course will not readily discontinue it, as it gives him a key to the whole system of pipes under his charge. I have all of my tests for years past tabled for reference for my own personal use, and it often surprises me to observe how the pressures vary from year to year, and during the year, as the increased or decreased demand comes on to the mains.

I now ask your attention to the service-pipes, and will begin with the street lamps, all of which I fit up with ½-inch lead-pipe of 3 lbs. weight to the yard, best soft lead, attached to the mains with brass ferrules having ground joints. I have specially-made plates with tinned and screwed ends for tap and lead pipe. I adopted lead for this purpose about four years ago. The rusting of the wrought-iron tube was so rapid, caused by the presence of the salt water and sea gravel, that, although I tried the best steam-tube for years before, I could not get it tostand more than three or four years. In the case of the house services, where they had to come from the middle of the street, they were eaten through in the channels, where the pipes were subject to damp or wet. Where ground is dry or sandy, however, wrought-iron will answer; but, for my part, I prefer lead, laid in timber troughing, to any of the plans of pitching and troughing that is now being adopted. It

is handier and simpler for medium size of works, where boiling pitch cannot well be taken to every small service that is put on. Again, the lead when taken up, is worth 70 per cent. of its first cost, whereas old wrought-iron tube is worth nothing, and, indeed, you can scarcely give it away.

Coming to another part of the service-pipe—viz., the end going into the building, I think it is wise, after the experience we have had in the law courts, not to allow the service-pipes to be buried under the flagged floors of consumers dwellings, but to have them nearest to the outer wall of the house, or in such a position that access can be readily had to the pipe for the stoppage of leaks, remembering that should any accident take place from that cause, the responsibility rests with the gas company up to the meter, and damage sustained might be recovered in a court of law. I think it quite time we gave more attention to these matters than they have hitherto had at our hands.

To sum up the question of unaccounted-for gas, and the proper method of ascertaining its amount, let me say that the station-meter should be sufficiently large, and not driven above 100 revolutions per hour; should have a self-acting water line for filling to, and the gas should not exceed the temperature of the air when measured. If these were attended to by all, there would not be such apparent differences in the make per ton as there are at present. Another thing is to state correctly how many feet per hour is taken for the consumption of each lamp, with average high and low pressure throughout the night. The gas used on the works should be measured, not estimated.

In the works of which I have charge, the make of gas last year, ending March, 1879, was 46 millions, at the rate of 10,100 feet to the ton of coal. This spread over 20 miles of mains, and 2700 consumers, with 470 street lamps in addition (the street lamps taking 4½ feet per hour each) gave as a result 9650 feet paid for, or a loss of 4½ per cent. on the gas made; and this latter item, I believe, can yet be reduced to 3 per cent. The coals I use are Wigan 4-feet mine, Orrell Arley, and Lancashire cannel, in proportion to make gas of from 18 to 20 candle power.

I believe if we endeavour to give a good supply of gas at not less than 16-candle power, and deliver it into the consumer's meter at a pressure not less than 10 or 12-10ths, nor greater than 20-10ths during the hours of burning, there will not be much cause of complaint.

The meter should be attached at the point where the service-pipe terminates, which point should be determined by the gas manager. The rule I adopt for the number of burners to be supplied, through different-sized meters is as follows:—

2-light meter	. . . . .	4 burners
3	„	8 „
5	„	12 „
10	„	20 „
20	„	50 „
30	„	70 „
50	„	100 „
80	„	150 „
100	„	200 „
150	„	300 „
200	„	400 „

Of course, I cannot pretend to fix a hard and fast line from which there is no deviation, but I adhere as near as may be to the above sizes, and especially in the first instance, when the supply is being laid on.

With respect to the meter itself, I have, after 15 years experience of dry ones, given up their use entirely some years ago, and although I have some two or three hundred in use out of 2700 of all sorts at work, as they come out, I never put them in again. Their registration is not to be relied on, either for the company or the consumer, after they have been at work a few years. You may take one out that has been, say, ten years at work, and find it quite correct; and you may take two or three others, and find none of them correct—one may be in favour of the company, the other in favour of the consumer, and either of them will vary at different pressures. After standing a little while, I have been annoyed with them causing all the lights to lift when set to work again. Leaks at the dials, also, are very common in dry meters. In my opinion, a good, well-made, plain wet meter is not to be surpassed; but I hold it to be of the first importance that all wet meters should be inspected and proved for correct water-line every two months at least. If this is not done, depend upon it, more will be lost by far than what the inspectors wages will amount to. I am not now referring to the taking of the index, but the watering only.

I now come to another stage of the subject, and a very much debated one it is. I allude to internal fittings. Some three or four years ago, I framed a code of regulations for the guidance of plumbers when fitting gas-pipes; and although we had not the power to enforce them at law, still, after a good deal of trouble at first, they came to be generally adopted. We could not get the regulations referred to drafted in our new Act passed this year; but we obtained power to make bye-laws, subject to the confirmation of the Local Government Board, and these bye-laws embody the whole of the regulations.

The following are the sizes and lengths of pipes to be used in premises according to the number of burners, viz.:—

¾-in.	tube,	not exceeding	20 ft.	in length,	to supply no more than	3 burners.
½	„	„	30	„	„	6 „
⅝	„	„	40	„	„	12 „
¾	„	„	50	„	„	20 „
1	„	„	80	„	„	40 „
1¼	„	„	100	„	„	60 „
1½	„	„	150	„	„	100 „
2	„	„	200	„	„	200 „

On the completion of the work of fitting, and before the pipes are covered up, notice in writing must be sent to the Manager, who will cause the work to be inspected, and if found in accordance with the above regulations, gas will be laid on; if not, the Committee reserve to themselves the right to refuse a supply until the necessary alterations are made.

The plumbers now carry them out without much trouble to us, but often neglect to send us word to inspect; but when our inspectors are going about, their eyes are open to any breach, which is at once reported, and a sharp letter sent to the offending plumber. Their adoption has been just what was wanted, and we have several hundreds of houses so fitted and giving every satisfaction.

Having now gone over all that I intended, I will leave to some other gentleman the question of the best burner for the million; merely remarking that my rule is to give any consumer a burner who will ask for it, providing ourselves with a stock for that purpose.

The President (Mr. T. Newbigging, Manchester) invited discussion, and

Mr. D. Clarke (Ashton-under-Lyne) said the paper read by Mr. Chew was a practical one, and well worthy the consideration of the members. Mr. Chew advocated having his trunk mains of equal area to all pipes branching from them; he doubted whether this could be done in practice. The feasibility of doing so would, he thought, depend greatly on the size of the mains and their respective lengths. With regard to having two mains in some streets, it might be that the additional main would more than equal the length of the service-pipes to be laid from it, which would be a positive disadvantage of the system, not to mention the other draw backs attending its adoption. As to lead service-pipes not being much affected by salt water, no doubt that was a proper argument to use as regarded Blackpool, and, of course, there was the advantage in their use that they could be sold, when worn out and taken up, at three-fourths their first cost. Service-pipes, whether lead or iron, should never be laid under the floor of a house, and he never allowed it. His experience was that the wet meter was much more reliable than the dry, and, therefore, more satisfactory. He quite agreed with Mr. Chew that it was desirable to have control of the men who did the internal fitting, in order to ensure pipes of ample size and good workmanship. He was not in the happy position of Mr. Chew in regard to leakage, for at Ashton-under-Lyne it was 11½ per cent., though that by most managers would be considered reasonably low. Attention to the consumption in the public lamps was a matter of great importance, and would reward any manager who devoted a portion of his time to the subject.

Mr. John Hutchinson (Barnsley) said that the district supplied by his Company was extensively undermined through colliery operations, the ground frequently sinking and breaking the pipes; his leakage was consequently heavy, being about 17 per cent. It had been as low as 10, and as high as 21 per cent. He had tried turned and bored joints, and also joints made with lead, but he found that whichever joints were adopted a policy of constant attention was required. If the various matters touched on by the author of the paper were minutely observed, it would be for the benefit of all concerned.

Mr. Dalgliesh (Glossop) agreed with Mr. Chew that the mains should be protected both from the effects of frost and overhead traffic by being laid at a depth of about 2 feet. He had a large and straggling district to supply, and, owing to the difference in level between the works and the lower parts, he had to keep an excessive pressure in the mains, both by night and day, which had the effect of making his leakage about 22 per cent. Owing to the bad state of the fittings that had prevailed in his district, he had recently adopted a code of regulations similar to those mentioned by Mr. Chew, and with satisfactory results.

Mr. Smith (Hyde) objected to a main pipe on both sides of the street, as expensive and unnecessary, and thought that lead service-pipes would have a tendency to sink in parts of their length, allowing water to accumulate, and so cause much trouble to the company, and annoyance to the consumers.

Mr. Hartley (Blackburn) had had considerable experience with lead service-pipes at Blackburn, and, whilst admitting that they sometimes sunk and gave trouble, he recommended their use because they kept down the leakage, which in Blackburn was only about 8½ per cent.

Mr. Carr (Halifax) expressed his surprise that the leakage per mile of mains had not been mentioned, because what was 50 per cent. in one case might be only 5 per cent. in another. Suppose, for instance, a pipe passed 10,000 feet of gas, of which 500 feet was lost, the leakage was 5 per cent.; but if the quantity of gas passing was doubled, the leakage was reduced one-half, and so on. The leakage, he thought, must be less where lead pipe was used for services, as his own experience taught him that the most costly leakages were in the service-pipes, and not in the mains. It was the almost imperceptible leaks which added up at the end of the year, and not so much the large ones, which were easily discovered and remedied. With a low leakage he should expect to hear of a high sale of gas per ton, and if that did not result, be the leakage never so low, there was mismanagement somewhere. With regard to turned and bored joints, as compared with lead joints, he was at issue with Mr. Chew; he considered that lead joints were the superior of the two, and less likely to be affected by settlement of the ground. He allowed no main less than 3 inches diameter to be used. Internal fittings ought to be carefully supervised; to allow a six-roomed house to have ¼-inch piping and a 2-light meter was simply robbing the company, as it necessitated excessive pressure over the district to afford the necessary supply. He considered, therefore, that gas companies, and local authorities owning gas-works, should have the power of inspection, and the licensing of properly qualified persons to do the work of internal fitting. He agreed with Mr. Chew as to the amount of capital, though in Halifax it was £900 or £1000 per million.

Mr. H. Legg (Ossett) had no doubt that the unaccounted-for gas could be kept down to a reasonable amount by attention to the matters pointed out in the paper, and more particularly by strict supervision of the meters. He preferred the dry to the wet, as they required no watering, and less general attention. If he doubted the registration in any case, he had the meter taken out and tested. He was paid for 3 feet per hour in the public lamps, and probably supplied 4½ feet, his leakage being 15 per cent.

Mr. Hunter (Stalybridge) said meters in his district were generally the property of the consumers, which he thought was a mistake, as the consumer naturally tried to save expense by purchasing the smallest possible size. The houses were fitted up on the same principle, everything being cramped, and necessitating a higher pressure than ought to be required under proper conditions. It was no unusual thing to find a 3-light meter supplying 10 to 20 lights. Much of the unaccounted-for gas could be traced to this cause. Street-mains should be of ample capacity; and, in his opinion, nothing less than 4-inch should be laid, where it was to be tapped for service-pipes.

Mr. Bridge (Doncaster) thought that much of Mr. Chew's successful working was to be attributed to the regular attention paid to the wet meters, and his supervision of the street-lamps. The lamplighters at Doncaster were under the police, and were required to report themselves before commencing to light up and put out, and were fined if they exceeded a specified time on their rounds.

Mr. W. Hutchinson (Barnsley) said that his experience in regard to meters was quite at variance with that of Mr. Legg. In a growing district turned and bored joints were preferable to lead, as they were more readily taken up, cleaned, and relaid when extensions were required; but in a place like Barnsley, which was undermined in many parts, he preferred lead joints.

Mr. Littlewood (Manchester) did not think managers, generally, took sufficient care to select the kind of material suitable for filling up the trenchs when iron pipes were laid. It was well known that ashes, when saturated with wet and damp, would destroy wrought-iron in a very short time, and sand, or clay, or good mould should be used to bed and cover the pipes. He was of opinion that lead joints were tighter and more reliable in ground subject to subsidence. In Manchester they were re-piping districts, replacing turned and bored joints with open sockets, and were hoping thereby to reduce the leakage, which at present was about 9½ per cent.

The President concluded the discussion, which, he said, had been an interesting and useful one. With regard to the question of laying a main on both sides of a street, he could not coincide with that suggestion, except in rare cases, when the street was of unusual width and the traffic heavy; and principally because it added materially to the capital outlay, whilst the joints of the mains—a considerable source of leakage—were doubled in number. He was, as a rule, in favour of turned and bored joints, and where these had been found to fail it was owing to an excessive amount of taper having been given to the turned and bored parts. All such joints should be carefully made to template, and when this was done, and the

turned portions made almost parallel, even in the case of a draw, there was but little escape of gas. In districts like Barnsley, which were extensively undermined, he believed the vulcanized india-rubber joint would be found of the utmost value, as it would allow of a drop in the ground to the extent of 6 or 8 inches without causing leakage, provided the pipe remained unbroken. He considered that, generally, the maximum pressure should not exceed 20-10ths, and when there was a necessity for more, an enlargement of the most contracted mains should be made. In the matter of internal fittings, managers, by judgment and tact, could exercise a very wide and useful supervision even without the aid of statutory powers. A gas manager who did his duty usually commanded a good deal of respect in his locality, and his advice in regard to such matters would generally be accepted and acted upon. In very large towns such personal supervision on the part of the manager was impossible, and under these circumstances, statutory regulation was most desirable in the interest of the consumers themselves. Reverting to the subject of leakage, he had just been making a rough calculation that in this country about 90,000 million cubic feet of gas was made per annum. Supposing the leakage on this to be 10 per cent., that would be 9000 millions, and taking this quantity at 2s. per 1000 feet, the total money value of the leakage would be represented by £900,000. Here was a mine of wealth in which all gas managers might dig, and of which they all might secure their proportionate share. He concluded by moving a vote of thanks to Mr. Chew for his very practical paper.

This was seconded by Mr. Smith, and unanimously carried.

Mr. Chew, in reply, said he was obliged to the members present for the vote of thanks that had been passed to him. In answer to some of the opinions that had been expressed on sundry points to which he had referred, he desired to say that in laying the lead service-pipes he placed wood casing underneath them, and made it of extra strength in crossing sewers and other places where subsidence was possible. Fourteen years ago his leakage was 33 per cent. He did not, however, ascribe the improvement that had since taken place to the use of the lead services, as he had only recently adopted them; but to careful general inspection.

Mr. Clarke moved, and Mr. Chew seconded a vote of thanks to Mr. Hutchinson for the manner in which he had received the members, which was carried.

Mr. Carr moved, and Mr. Littlewood seconded a vote of thanks to the Directors of the Barnsley Gas Company for allowing the use of the room, which was also carried, and the meeting terminated.

ELECTRIC LIGHTING AT LIVERPOOL.

We have been favoured by Mr. G. F. Deacon, the Borough and Water Engineer of Liverpool, with a copy of his Report to the Library, Museum, and Arts Committee, as to the Lighting of the Picton Reading-Room by Electricity. This is the report referred to at the last meeting of the Town Council (see Journal, p. 406), and it is as follows:—

Municipal Offices, Aug. 29, 1879.

Since submitting the tender of the British Electric Light Company on the 21st inst., the Engineer has obtained further information, and begs to report as follows:—

The semi-portable engine proposed by the Company for working ten lights will be of 14 nominal horse power, and will work up to two or three times this power. The size will be such that it cannot be conveniently placed in the vaults beneath the Free Library. There is abundant space, however, behind the Picton Reading-Room, but the adoption of this space will involve the erection of an engine-house.

The following estimate, which will enable the Committee to compare the probable cost of lighting the Picton Reading-Room by electricity with the cost of gas, is prepared on the assumption that the expenditure in gas-pipes and fittings is an item to be incurred in any event. The cost of the gas consumed is therefore compared not only with the cost of working the electric light, but also with the interest on capital and maintenance, and all the apparatus necessary for the installation of the electric light:—

Capital Account.

Engine, machines, &c., to be provided by the British Electric Light Company	£729	0	0
New engine-house, foundations for engine, door through wall, &c.	225	0	0
Glass screen, &c.	30	0	0
Central column, &c.	80	0	0
Contingencies, 5 per cent.	50	0	0
	£1114	0	0

Annual expenditure on electric light for comparison with gas consumed (assuming gas-fittings and pipes to be already in use).

Interest on capital (£1114) at 4 per cent.	£45	0	0
Repairs, depreciation, &c.	100	0	0
Fuel and stoves	40	0	0
Wages of attendant	90	0	0
Carbons for the three lamps, at 8d. per hour (four hours per day for 300 days, and 5 per cent. loss for breakages)	42	0	0
Per annum	£317	0	0

Judging from experience recently obtained by the use of gas in the Picton Reading-Room, the Engineer is of opinion that in order to light it in a satisfactory and permanent manner an expenditure of 1800 cubic feet per hour would be necessary. The cost for gas alone would, therefore, be £360 per annum. These figures show that even if an engine sufficient to drive ten lights be obtained, and be used only for the three lights in the Picton Reading-Room, and if the whole cost be charged to the Picton Reading-Room, the total charges both on capital account and for maintenance will be considerably less than the cost of gas alone, while the actual illuminating power of the electric light will be 10,000 to 12,000 candles, and that of the gas only 7000 candles, though it is probable that a larger proportion of the electric light will be lost by absorption than of the gas.

If ten lights were ultimately employed and driven by the same engine the increased annual cost, including interest and maintenance, would only be about £300; and if the additional electric lamps were substituted for gas in the same proportion as is proposed in the Picton Reading-Room it would displace gas to the value of £1200 per annum; but, inasmuch as the additional lights would probably be employed in positions less favourable to the electric light than the Picton Reading-Room, the actual excess of efficiency of the electric light over gas would be somewhat, though probably not greatly reduced.

Sale of Gas and Water Shares at Folkestone.—Last Tuesday there were sold by auction five £10 paid-up new created shares in the Folkestone Gas and Coke Company, and 106 paid-up shares in the Folkestone Water-Works Company. The former sold at £14 5s. each, while the water shares realized from £17 17s. 6d. to £19 each.

DOVER GASLIGHT COMPANY.

The Half-Yearly Meeting of this Company was held on Tuesday, the 2nd inst.—Mr. W. R. Mowll in the chair.

The Secretary (Mr. G. Fielding) read the notice of meeting, and the following report of the Directors was presented:—

We are again able to lay before you a satisfactory report and accounts for the past half year.

The quantity of gas sold has increased during the year to 110 millions of cubic feet.

The structural works mentioned in our last report are now in course of erection, and we expect to have them in full work for the winter consumption.

We offered 200 of our new £10 shares for sale on the 3rd of July last, which produced an average price of £14 14s. per share.

We recommend the declaration of the usual dividend for the half year, at the rate of 7½ per cent. per annum, the payment of the arrears of dividend for 1863, and the carrying to the reserve-fund of the balance of profit, amounting to £481 6s. 11d.

Dr. *Profit and Loss Account for the Half Year to June* 30, 1879. Cr.

Coals	£4,667	12	11	Sale of gas, less discounts and bad debts	£10,122	9	4
Purifying	134	12	10	Coke, tar, & other residuals	2,343	12	3
Repairs and maintenance of works, meters, mains, &c., including labour	2,131	11	11	Meter and fittings rentals	215	17	5
Wages for gas-making	896	8	8	Profits on gas-fittings and asphalting	92	13	11
Lamps—providing, lighting, extinguishing, cleaning, & repairing	292	10	2	One year's dividends on Consols	25	18	3
Rents, rates, and taxes	475	15	8				
Salaries, Collector's commission, and Directors	855	3	4				
Interest on loans	195	16	8				
Incidental expenses	103	15	3				
Solicitor's charges	32	3	10				
Balance	3,037	19	8				
	£12,830	10	11		£12,830	10	11

Balance-Sheet, June 30, 1879.

Capital raised	£56,200	0	0	Cost of works, less depreciation	£66,439	18	5
Statutory mortgages	10,000	0	3	Book debts	5,365	3	0
Premiums on new shares	5,494	11	1	Coals, coke, sundry stocks, and plant	4,027	3	10
Balances of profits accounts	5,108	11	11	Invested in Consols	1,234	5	4
Coal insurance-fund	100	0	0	Bankers	3,659	3	6
Deposits from consumers	331	19	9				
Sundry liabilities	652	11	8				
Balance	3,037	19	8				
	£80,925	14	1		£80,925	14	1

The Chairman said the salient point in the report was the quantity of gas sold during the past year—viz., 110 million feet. It was a matter of great interest to watch the growth of a Company like this. In the year 1864, the total make of gas was only 57,174,000 feet; in 1877, the make had increased to 92,827,000 feet; in 1878 the quantity reached 103,951,000 feet, and in the present year the total make of gas was 120,483,000 feet. There was nothing marvellous about the growth of the consumption, because it amounted to this, that whereas gas a few years ago was used as a luxury, it was now a necessity. Turning to the number of consumers, it would be seen that they had increased likewise, for in 1877 they numbered to 1943, in 1878 they increased to 1964, and this year they were 2014. To show that, in consequence of the rapid growth of the consumption of gas, the real interest of the Company was not likely to be prejudiced by passing events, there was one fact to be borne in mind, and it was relative to the public consumption of gas. This only amounted to so small a quantity that, if circumstances should arise by which the Company would lose the public lighting, they would be in a far better position to pay their dividend than in the years 1877 and 1878. He merely mentioned this because it was just possible that circumstances might arise in which timid Shareholders might think their property in jeopardy; but, so far as he could see, and he did not profess to be a very long-sighted man, and so far as men of science—men who had made this subject a matter of study—could see, their testimony was united upon the one point, that whatever might come—whatever might be the success of their respected and respectable competitor, the electric light, the interest of gas proprietors would not be disturbed in the present generation. He remembered at the end of the last half year he ventured to say that, as a lover of science himself, he should be sorry to say one word to prejudice the electric light, and he was sure that, as intelligent citizens, they must hail with satisfaction the great advances that science was making in the present day. Undoubtedly there was a future for the electric light—a grand future, too; but he only saw it looming in its applicability to lighthouses and for the defence of our iron-clads, and further for lighting large spaces, and for the supply of light where the supply was a given quantity. But the moment the requirements of the light ceased to be uniform, that moment the electric light, in its present stage, must get out of the way. For there were several difficulties to be overcome before the electric light could successfully compete with gas. First, the cost of it; though, undoubtedly, as science advanced, that would be reduced. Next, the sub-division of it. This, possibly, as science advanced, might also be equally and satisfactorily accomplished. Then they came to the question of storing the electric force. In so far as his reading went, no man had yet hit upon anything which produced a scintilla of evidence that a single step had been taken towards succeeding in storing it. They all knew very well that they could charge an electrical battery, and if they liked to have an electrical battery a mile square, they could charge that battery; but the moment they made any communication between it and the earth, that moment must the electricity stop and the battery pass away. Hence it followed, so far as the electric light was concerned, that it must be used as it was generated. Then, say, in a row of houses, some occupied by persons with a large family and some by persons with a small family, it must happen that where there was a large family living, more light was wanted than where a small one was living; and, assuming they agreed to take the electric light, in its present state, it followed that each house must pay for the light in proportion to the rent of the house, and it struck him that Englishmen were very much altered in their idiosyncrasies if they were disposed to pay for that which their neighbours used. There was another matter which, also, at the present time, seemed to be an insuperable barrier to the general adaptation of the electric light, and that was the necessity of finding some substance which should enable the light to exhibit itself as it were. At present it was exhibited by a composition of two carbon points, which required replacing as they burned out. Looking at the fact that at the moment that candles were invented which required no snuffing they took the place of candles which needed snuffing, not because they were cheaper, but more advantageous, it struck him that, even supposing the electric light came more into use, there still remained the difficulty in measuring and storing it. It would thus never compete on equal terms with gas until some substance was discovered which could burn without consuming. He therefore did not hesitate to say that, so far as science at present went, there was as bright a future before gas companies as there had been a bright past; and, looking at the fact with reference to their shares, that when some were put up for sale by auction the other day they fetched a premium of very nearly 50 per cent., he thought they might take it as a capital indication

of the confidence which the public generally had in the bright future of the gas companies. They would notice by the balance-sheet there was a balance in hand applicable to dividend of £3037 19s. 8d. They had taken advantage of the good times through which they were passing, so far as the purchase of coal was concerned, and therefore re-arranged certain portions of their works which the advance of science told them they should better themselves by doing. Out of the £3037, the Directors proposed, and he moved that that they pay the usual dividend for the half year at the rate of 7½ per cent., and arrears of dividend which accrued on the stock in existence in 1863; and that they carry the balance of £481 6s. 11d. to the reserve-fund they were establishing with the view of rendering their property still more secure.

Mr. BOTTLE having seconded the resolution, it was carried unanimously.

The retiring Director (Mr. W. R. Mowll) and Auditor (Mr. C. K. Worsfold) were then re-appointed; and the proceedings ended by passing a vote of thanks to the Chairman.

BRIGHTON AND HOVE GAS COMPANY.

The Half-Yearly Meeting of this Company was held at the London Offices, 29, St. Swithin's Lane, on Friday, the 5th inst.—Mr. F. E. WEBB in the chair.

The SECRETARY (Mr. W. H. Hardy) read the notice convening the meeting, and the following report was taken as read:—

In presenting the accounts for the half year ending June 30, 1879, the Directors beg leave to express their satisfaction with the result of the Company's operations during that time.

The Directors congratulate the Proprietors upon the passing into law of the Bill promoted by them in the last session of Parliament. The Act of 1879 confers upon the Company important powers in respect of further capital and land, and the value of the Company's undertaking has been thereby greatly enhanced.

From the profits of the half year the Directors recommend that the following dividends be declared:—Upon the original shares at the rate of 10 per cent. per annum; upon the A original shares at the rate of 7 per cent. per annum; upon the B original shares at the rate of 6 per cent. per annum; all free of income-tax.

Profit and Loss Account, for the Half Year ending June 30, 1879.

Expenditure.

Coals	£12,853	4 0
Purifying materials and process	389	10 6
Repair and maintenance of meters, mains, service-pipes, and other works	3,895	13 8
Wages	2,720	6 3
Lamps—providing, lighting, extinguishing, cleaning, and repairing	214	10 0
Rent, rates, and taxes	883	2 8
Salaries, Collectors commissions, and payments to Directors	2,645	16 10
Interest on loans	1,253	6 8
Professional charges and incidental expenses	44	7 0
Estimated discounts and bad debts on rental	92	2 1
Dividends paid to Proprietors, viz.—		

On Capital.

Per Cent.	Paid Up.	Class.	Raised under Act.	Amount.		
10	£100,000	Original ordinary	Vic. 2, c. 38	£5000	0	0
7	50,000	A ordinary	„ 29, c. 184 / „ 38, c. 169	1750	0	0
6	50,000	B preference	„ 29, c. 184	1500	0	0
				8,250	0	0
Balance carried to next half year's account				12,782	4	1
				£46,024	3	9

Receipts.

Balance brought from last half year's account	£11,518	10 3
Sale of gas	28,192	5 4
Coke and breeze	3,905	15 4
Tar and other residuals	2,407	12 10
	£46,024	3 9

DR.—*Balance-Sheet.*

To Capital raised under Act—			
Vic. 2, c. 38, original ordinary shares	£100,000	0 0	
Vic. 29, c. 184, / Vic. 38, c. 169, } A ordinary shares	56,250	0 0	
Vic. 29, c. 184, B preference shares	50,000	0 0	
		£206,250	0 0
Debenture stock		51,200	0 0
Reserve-fund		13,035	8 0
Capital in trade		8,000	0 0
Amount owing by Company		3,005	3 7
Balance, as above		12,782	4 1
		£294,272	15 8

CR.—*Balance-Sheet.*

By Cost of works to Dec. 31, 1878	£255,181	0 5	
Ditto (add extensions made during the half year)	4,628	16 0	
		£259,809	16 5
Amount invested of reserve-fund		4,818	15 0
Amount owing to the Company for gas, coke, residual products, &c., exclusive of estimated bad debts		12,404	13 10
Coals in stock		3,754	9 2
Residual products and other stocks		454	3 0
Cash in hands of Treasurer, Cashier, &c.		13,030	18 3
		£294,272	15 8

Proposed Appropriation of Profit.

September, 1879.—Dividend for half year on share capital—			
On original ordinary shares, at 10 per cent. per annum	£5000	0 0	
On A shares, at 7 per cent. per annum	1859	7 6	
On B preference shares, at 6 per cent. per annum	1500	0 0	
		8,359	7 6
Balance forward		4,422	16 7
		£12,782	4 1

The report was adopted, and the dividends recommended therein were declared.

Messrs. F. Fuller, E. Homan, J. Warren, F. E. Webb, and G. F. Whiteley were re-elected Directors for the ensuing year.

Messrs. P. Colley, R. H. Jones, J.P., and J. Balfour were re-appointed Auditors, and a vote of thanks was given to them for their services.

It was also resolved—"That the thanks of the Proprietors are due, and are hereby given, to the Directors for their attention to the interests of the Company;" "That the thanks of the Proprietors be given to Mr. Paddon, the Manager, and to Mr. Hardy, the Secretary, for their attention to the duties of their respective departments;" and "That the thanks of the meeting be given to Frederick Ernest Webb, Esq., for his able services in the chair."

THE PURCHASE OF THE DERBY WATER-WORKS BY THE CORPORATION.—At the meeting of the Derby Town Council on Monday, the 8th inst., a motion—"That this Council resolves that the Finance Committee be and is hereby authorized to carry out the terms of the Derby Improvement Act, 1879, with respect to the purchase of the Derby Water-Works"—was agreed to. It was stated that the Finance Committee would act until after the next election in November, and then a Water Committee would be appointed.

HASTINGS AND ST. LEONARD'S GAS COMPANY.

The Annual Meeting of this Company was held on Thursday, the 4th inst.—Mr. J. ROCK in the chair.

The following is the report of the Directors:—

The addition to the Company's purifying capacity, alluded to in the last report, is now in progress, and it is hoped will be completed before next winter.

The electric light has still continued to occupy the attention of your Directors, but they see nothing in it to require any further notice than was given in their last report.

The Directors will recommend, at the meeting to be held on the 4th day of September, that 375 new shares of £20 each (being a further portion of the 3000 shares created by a resolution passed at a meeting of the Shareholders held on July 14, 1865) be issued, and the Shareholders will be asked, at such meeting on the 4th of September, to decide how and on what terms such 375 shares, or any part thereof, shall be disposed of, and to do all other acts, and pass such resolutions as may be necessary or thought fit, in regard to the issue or disposal of the said new shares.

The accounts, duly audited, leave a balance of £4075 4s. 4d. for the past half year, which, with the amount of £499 10s. 11d. brought forward, gives the sum of £4574 15s. 3d. to be dealt with by the Shareholders; and it is proposed to pay a dividend at the rate of 10 per cent. per annum on the £25 shares, and a dividend at the rate of 7 per cent. per annum on the £20 shares, amounting together to £3637 10s., leaving a balance of £937 5s. 3d. to be carried to the next account.

The CHAIRMAN, having expressed regret at the absence of Mr. Scrivens and Mr. Thorpe, both of whom were prevented from attending, said that notwithstanding the general depression in trade the Company managed to keep their heads above water. During the past year there had been considerable extension of the works, such as they found every few years was requisite to meet the requirements of increased consumption. This had necessitated great expenditure, and the question now before the meeting was, how much capital they should issue to meet the demand? He moved that the report of the Directors be adopted.

This was seconded, and carried unanimously.

It was resolved that Messrs. G. A. Thorpe, C. H. Gausden, G. Clement, and H. Thwaites be re-elected Directors; and Mr. W. Hallaway, Auditor of the Company.

Upon the recommendation of the Directors, it was agreed that the 375 shares, referred to in the report, be offered to the Shareholders; and that if the shares were not taken up, the Directors should consider the best other mode of disposing of them.

The SECRETARY (Mr. W. B. Young) said that these shares would realize £7500 new capital, the existing capital being £86,250. He explained how the shares would be allotted to the Shareholders, who numbered 254.

The CHAIRMAN drew the attention of the Shareholders to an explosion that had recently taken place in connection with some gas-works in the country, thus showing that they were carrying on a trade of considerable risk.

Mr. WINTER suggested that they add another £500 to their insurance policy, but no step was taken in this direction.

Mr. SIMPSON asked whether he might be allowed to put a question to the Company's Engineer (Mr. A. H. Wood), but the CHAIRMAN ruled that, not being a Shareholder, he was out of order, and that the question could not be put.

A vote of thanks was accorded to the Chairman and Directors of the Company, and the business of the meeting ended.

PORT ELIZABETH (CAPE COLONY) GAS COMPANY, LIMITED.

The Seventeenth Annual Meeting of this Company was held on Friday, Aug. 8—Mr. R. THOMPSON in the chair—when the following report was submitted and unanimously adopted:—

The Directors have pleasure in submitting to the Shareholders their seventeenth annual report.

The annexed audited statement of the accounts for the year ending June 30, 1879, shows a net profit of £3842 12s. 11d., which they recommend should be appropriated in the following manner, viz.:—

Buildings	£150	0	0
Plant	1000	0	0
Meters	200	0	0
Reserve-fund (making it £5100)	350	0	0
Directors	250	0	0
Auditors	42	0	0
Dividend to Shareholders, 9 per cent.	1759	1	0
Balance to next year	91	11	11
	£3842	12	11

The amount would have been somewhat larger, but in order that the assets of the Company should not be over-rated, the Directors have written off accounts (some of which may be considered doubtful and probably partly recovered) to the amount of £209 2s. 9d.

The Directors are gratified at being able to state that a fair and equitable contract has been concluded with the Municipality during the past year, whereby they have agreed to light 50 more lamps during this year and the next.

The quantity of gas sold during the past year has been 7,974,200 cubic feet, against 7,620,300 cubic feet in the previous year, showing an increase of 353,900 cubic feet.

DR. *Balance-Sheet, June 30, 1879.* CR.

Shareholders for capital	£19,545	0 0	Buildings	£3,738	10 1
Reserve-fund	4,750	0 0	Land	265	11 0
Unclaimed dividends	178	4 6	Plant	13,551	18 1
Sundry creditors	23	9 11	Stock—		
Balance	3,842	12 11	Meters in stock	478	13 4
			Meters at rent	817	14 4
			Coals	2,054	10 0
			Gas	40	16 0
			Tar	215	1 6
			Coke	98	0 0
			Fittings, pipes, &c.	2,847	3 0
			Coal bags	45	12 6
			Office furniture	71	2 8
			Gas consumers	1,774	5 6
			General accounts	1,123	19 11
			Cash	1,216	9 7
	£28,339	7 4		£28,339	7 4

DR. *Profit and Loss Account, June 30, 1879.* CR.

Wear and tear	£376	18 0	Balance from last year	£2	8 8
Interest	0	1 6	Gas manufacture	4,871	19 3
Salaries	710	11 8	Fittings	234	9 3
Wages	741	17 3	Coke	505	2 0
Fire assurance	55	10 4	Tar	256	17 0
Miscellaneous expenses	243	1 2	Rent of meters	300	9 11
Bad debts	209	2 9	Transfer fees	8	9 6
Balance	3,842	12 11			
	£6,179	15 7		£6,179	15 7

The CHAIRMAN, in moving the adoption of the report, said that the prospects of the Company had never been more promising. A satisfactory contract had been concluded with the Municipality; the residual products of the Company (tar and coke) had been largely sold; gas-engines had been found to be economical; and very soon, no doubt, great improvements would be made in gas-stoves, causing a large increase in the consumption of gas. Bad and doubtful debts had been written off, and the books and accounts of the Company were never better kept. The accounts due to

the Company were well collected by the present Secretary, Mr. Binckes, who was fully entitled to the thanks of the Shareholders for his energy and perseverance. The untiring services of the Manager, Mr. Kendle, in keeping the plant in good working order were fully recognized, as also his constant attention to the quality and supply of gas. The stock of the Company had been valued very carefully at current values, irrespective of their original cost, and as the markets were never before so low, it might be reasonably supposed that prices would advance, the Company deriving the benefit of any increase. Despite the desire of several Shareholders that a larger dividend should be declared, the Directors deemed it prudent to refrain from doing so at present, feeling that ultimately the Company would reap the benefit. Some reference was made to the effect of the electric light on the Company's shares, and the price had fluctuated for a while; but this was only temporary, and prices had again risen to their former level. The increase in the consumption of gas had not been so large last year as in the previous year—a fact which was attributed to the depression of trade.

On the motion of Mr. J. A. Holland, seconded by Mr. W. S. Jones, the retiring Directors, Messrs. R. Pinchin and R. Pettit, were re-elected; and, on the motion of Mr. W. A. Tweeddale, seconded by Mr. A. L. Blackburn, Messrs. W. Selwyn and N. A. Pattison were appointed Auditors for the ensuing year.

A vote of thanks to the Chairman concluded the proceedings.

LEWES WATER-WORKS COMPANY.

The Annual Meeting of this Company was held on Monday, the 8th inst.—Mr. E. Morris in the chair.

The Secretary (Mr. H. Jones) read the following report:—

The Company's accounts for the year which terminated on the 24th of June last having been completed and audited, the Directors, in accordance with their usual custom, send an abstract thereof to the Shareholders.

It will be observed that the income for the year was £2336 16s. 1d.; that the expenses charged against that amount, including the irrecoverable rents and deductions for empty houses, were £1088 14s. 3d.; leaving for distribution £1248 1s. 10d.

The Directors are glad to be able to report that the number of the renters is steadily increasing. The addition to the rental for the past year amounted to £79 9s. 4d. The expenses, however, for the past having been higher than for the previous year, the balance for appropriation is not so large as otherwise it would have been. The Directors, however, have reason to hope that the same rate of expenditure will not be continued.

After applying £120 in payment of the preferential dividend due to the preference stockholders, there will remain £1128 1s. 10d. for the payment of the dividend upon the ordinary shares. The Directors recommend that a sum of £50 6s. 2d. be brought from the reserve-fund of £158 16s. 7d. and added to such £1128 1s. 10d., which together will amount to £1178 8s., and that a dividend of 9 per cent. be paid upon the original share capital of £6000 and 7 per cent. on the new share capital of £9120. The reserve-fund will then amount to £108 10s. 5d.

There is nothing in the history of the Company for the past year which calls for any special mention by the Directors. They have continued to devote a considerable amount of time and attention to the affairs and business of the Company, with a view to maintain them in the sound and healthy condition in which they have long been, and they have reason to believe their efforts have not been unsuccessful. The Manager of the Company has reported to them that all the machinery and works belonging to the Company are in a satisfactory state.

The Chairman, in moving the adoption of the report and accounts, said he hoped that the Shareholders would agree with the Directors that, on the whole, the report was of a satisfactory character, although some might feel disappointed that they did not propose to give 10 per cent. on a portion of the capital the same as last year. It was a question with some of the Directors then whether they were justified in recommending that dividend, but this year it was thought prudent to reduce it by 1 per cent. They, therefore, proposed to give 9 per cent. on the old and 7 per cent. on the new capital—the latter being the fullest extent to which they could go. He trusted they would agree that the reduction of 1 per cent. on a portion of the capital was no proof of the diminished success of the Company, which he believed to be in a thoroughly satisfactory and healthy condition. He, for one, was not prepared to say that the Shareholders, under any and every circumstance, should expect the same dividend each year; and when they reflected that, although they were a commercial Company, one of their chief objects was to give the town of Lewes a continuous supply of the purest water, it was gratifying to find that, while accomplishing this, their efforts had also been crowned with success in giving a reasonable dividend to the Shareholders for the money they had invested in the Company. Pure air and pure water were essential elements of human well-being, and he ventured to say that no town was better off than Lewes in those respects. Some who, like himself, were Shareholders when the Company was first started, would remember that they were not very successful—they had a very uphill game to fight; but now their position was far different—the town had good water continuously, and the Shareholders a good dividend. It was probable that next year the Directors might find it necessary to call in a further portion of the new shares—480 of £25 each, on which £19 had been paid. As a private individual he did not like to overdraw his banker's account, and he did not think it creditable that a public company should do so. He did not say it would be necessary to make a further call on unpaid-up shares, but it was probable they would.

Mr. Crosskey, in seconding the motion, said he fully endorsed the remarks of the Chairman. During last year the Company took upon themselves to supply a great many cottages, which was not a profitable part of the business, but it carried out the idea of the Chairman in supplying good water to a class of the population amongst whom it was very necessary to have a pure and good supply.

Mr. Broad said that whilst gratified to hear the remarks of the Chairman and Mr. Crosskey, he was one of those who looked for a fair remuneration for the Shareholders, and would have been glad if the Directors had seen their way to recommend 10 per cent. on the original shares, even if the new shares only had 6½. He thought it was reasonable that those who began the Company should have all they were entitled to.

The motion was then carried unanimously; also a resolution, moved by Mr. Broad and seconded by Mr. Walston, directing the payment of the dividends recommended in the report.

Mr. C. Parsons moved a vote of thanks to the Directors—a resolution which, he said, needed no comment from himself, as the facts spoke for themselves. He was perfectly satisfied with the dividends given, and hoped there would be equally good ones in years to come.

Mr. E. Hillman seconded the motion, which was agreed to.

The Chairman, in acknowledging the compliment, said all the Directors had manifested the great interest they felt in the prosperity of the Company; but there were none to whom the Company were more indebted than to the Works Committee (Messrs. R. Crosskey, R. Lambe, and G. Lenny). Were it not for the increasing interest shown in the business by those gentlemen, he doubted whether the Company would be in such a good position.

On the proposal of Mr. R. Blaker, the retiring Directors (Messrs. J. L. Parsons and R. Lambe) were re-elected; and £100 was voted to the Directors for their services. The Auditors (Mr. C. Parsons and Mr. E. Hillman) were also re-elected; and the meeting concluded with a vote of thanks to the Chairman.

EXTENSIONS AT THE SALFORD CORPORATION GAS-WORKS.

Last Wednesday the Mayor of Salford, and the Members of the Corporation Gas Committee, including Alderman Sharp (Chairman of the Committee), Alderman Husband, Alderman Gendall, Alderman Dickins, and Messrs. Toulson, Robinson, Kellett, and Shaw, visited the gas-works, Liverpool Street, Cross Lane, on the occasion of the completion of a new gasholder and tank. There were also present Mr. Samuel Hunter (Gas Engineer), Mr. Jacob (Borough Engineer), and Mr. Healey, one of the Contractors. The party descended to the bottom of the gasholder-tank (40 feet 6 inches from the surface of the holder), in a cage, lowered by a capstan and stationary engine; and, on reaching the bottom, inspected the holder.

Alderman Sharp expressed his pleasure at so many of the Committee being present, and congratulated them on the completion of the work.

The Mayor said that it was a most interesting occasion, such as might not occur again in the lives of those present. It would be well if Mr. Hunter gave them some description of the work.

Mr. Hunter said that the contracts for the work were let in January, 1878—the tank to Mr. William Healey, of Salford, and the gasholder to Messrs. Thomas Pigott and Co., of Birmingham. The work commenced on Feb. 4, 1878, and the tank was completed in February, this year. The gasholder had occupied in its construction from that time till now—viz., five or six months. There were difficulties in regard to the construction of gasholder tanks in making them circular and water-tight. In this case, happily, these difficulties and all others had been satisfactorily overcome. The tank was found to be perfectly circular, and there was every appearance of its being water-tight. The best test of the quality of the tank was the fact that the holder, made in Birmingham, was taken to pieces, sent to Salford, and riveted together without the slightest remodelling or alteration. The tank alone held 4 million gallons of water, the size being 154 ft. in diameter by 40 ft. 6 in. in depth from the base of columns to the rest-stones for the gasholder. The height of the holder was 80 feet, and its diameter 150 feet. The holder was telescopic, and had a capacity of about 1,400,000 cubic feet. It would increase the storeage power of the works from about 3¼ to 4½ million cubic feet of gas. However extensive this storeage power might appear, it was a fact somewhat startling to the uninitiated that one dark winter's day of 24 hours would entirely empty the whole of the gasholders. As the consumption of gas was very rapidly increasing, it would be necessary soon to build another holder. Last year the consumption of gas had increased about 65 million cubic feet over the preceding year. The cost of the new tank and holder, altogether, might be put down at £22,000. The water to fill the tank would cost about £130. This work was part of the scheme for the extension of the gas-works, for which the Council had voted £160,000 in 1877.

After thanking Mr. Hunter for his description, the party ascended to the top of the holder.

STOCKTON AND MIDDLESBROUGH CORPORATIONS WATER SUPPLY.

A Meeting of the Stockton and Middlesbrough Joint Water Board was held on Monday, the 8th inst.—Mr. T. H. Bell presiding.

The following report by the Clerks to the Board (Messrs. J. T. Belk and H. G. Faber) was presented:—

The South Stockton Urban Sanitary Authority having given notice that they intend, under the powers contained in the Stockton and Middlesbrough Corporations Water-Works Act, 1876, to become joint owners of the water undertaking with the two Corporations, it will be necessary to apply to Parliament next year for the necessary powers to enable them to do so, and to raise money to pay for their share (1-12th) of the undertaking. There are several other matters in the Act which require alteration, and we think it right, therefore, to call the attention of the Water Board to the matter, and to lay before them the different objects which, amongst others, we think should be sought to be obtained in the new Act.

1. Is, of course, the power for South Stockton to join and raise money.
2. To make the necessary alteration in the representation of Stockton.
3. To amend the existing Act, by taking power to raise the money which was expended in obtaining the Act, and the other expenses, such as the arbitration, to which the Corporations were put.
4. To extend the time for the commencement of the works. The Board will remember that the Corporations, by section 67, are bound to commence certain of the works within six months after the vesting in them of the undertaking of the Company, and this has not been done.
5. To extend the time for completion of the works, which, by the same section, should be finished, part within six years after their commencement, and the remainder within ten years from the passing of the Act.
6. To extend the time for taking land, the compulsory power for doing which will expire at the end of five years from the passing of the Act.
7. Power to alter or abandon any of the works mentioned in the Act.
8. To postpone the commencement of the sinking-fund, though we are bound to say that we consider it very doubtful whether this would be allowed, but we would recommend its being tried for on the ground that the amount awarded for compulsory sale and prospective value were so great, and the times since have been so bad, that the formation of a sinking-fund at the present time will press most heavily on the ratepayers.

Some discussion ensued as to the charges authorized in the Act for the supply of water to ironmasters, and as to the advisability of application being made to Parliament to alter the scale.

It afterwards having been agreed to strike out recommendation No. 8,

Mr. D. D. Wilson thought the powers might be obtained by Provisional Order.

The Chairman moved—"That the report of the Clerks on the amendment of the Act of 1876 be referred to them, in order that they may confer with the Town Clerk of Middlesbrough, the Town Clerk of Stockton, and the Clerk of the South Stockton Local Board, and take such action as they may deem necessary with a view to ascertain whether the powers to be obtained could not be obtained by Provisional Order."

Mr. Dunning moved—"That the Clerks be also desired to consider the repeal of the amendment of the 85th section of the Act, in order that the charge for water to the ironmasters shall be the same as it was under the old Company."

The Mayor of Middlesbrough seconded the motions, and they were both agreed to.

The Finance Committee reported that the profits for the six months were £15,000, and that, after paying certain expenses, it was expected about £13,000 would go to the revenue account.

In answer to the Mayor of Middlesbrough,

The Chairman stated that £15,000 was available, but from that must be deducted about £1000, which reduced it to £14,000, and the Committee were of opinion that there would be other extensions to make, for which they had not borrowing powers, so that they felt some allowance must be made for that.

Mr. Dunning thought if they could not charge capital with money spent in the extension of the works, then they should go in for powers, in the Provisional Order, to enable them to do so.

The Mayor of Middlesbrough agreed with this, and held that they had much better over-estimate the revenue at present than under-estimate it, so that they might take as little as possible from the ratepayers.

Mr. Dunning said the gross revenue of the Board had been about £42,000, and the gross expenditure had never formerly exceeded £12,000, whereas the expenses had been gradually coming up lately until the

Finance Committee had said they would amount to £16,000. He thought they should set their faces against increasing the expenditure.

Some further conversation took place as to whether the amount ought to have been estimated at £13,000 by the Finance Committee, or £15,000 by Mr. M'Kay, who had been asked to provide a professional estimate, and the Board then proceeded to other business.

THE PURCHASE OF THE COLCHESTER WATER-WORKS BY THE CORPORATION.

Local Government Board Inquiry.

On Wednesday, the 3rd inst., an inquiry, by order of the Local Government Board, was held at Colchester, upon the application of the Town Council for sanction to borrow £60,000 for the purchase of the undertaking of the Colchester Water-Works Company. The Inspector who attended was Mr. J. T. Harrison.

The Town Clerk (Mr. H. Jones), after the usual preliminaries, said: By a very old private Act of Parliament, passed in the 48th year of the reign of King George III., there was a Company of private individuals formed, called the Colchester Water-Works Company, who had power to purchase lands and erect water-works, and to charge certain rates in respect of the supply to divers individuals; but there was no compulsion upon them as to where they should extend their mains to, and, in point of fact, it resolved itself into a sort of personal contract between the Company and persons who wanted a supply of water. Those works were carried on for a very long period, and I believe it is admitted by the Company, and it is pretty well known to the public, that for a long series of years they were of anything but a remunerative character; but when the camp came here, and when the railway, previous to the camp, came here, and when, owing to the prosperity of the place, Colchester extended itself in all directions, and the town was very much increased in size, and buildings of a far superior character to what we had heretofore had in the shape of residences, and so forth, had been built, the works of the Company were, at their own private cost, extended, and the result has been that a very considerable change has come over the property, and it is admitted, and has been admitted now for some time, as clearly as it was allowed before, that the property has been of a remunerative character, and increasingly so. Well, in this state of things, and regard being had to the Public Health Act—because even under that we had no power to deal with the Company compulsorily—the Council called upon me to make a report to them with regard to the facts and circumstances of the question, and as to those parts of the town which were well supplied—although the supply was intermittent only, and in no part of the town was water kept continuously at high pressure, not even for the prevention of fire or casualties of that sort. In obedience to their request, I submitted to them a detailed report of what the facts and circumstances seemed to be, so far as I could arrive at them. That report, of course, was made public; and seeing that it probably might be felt to become the duty of the Urban Sanitary Authority to provide efficient water-works of their own, the Company set to and put their house in order, and they applied to Parliament during last session for an Act, asking, among other things, for an increase of capital of £35,000, and for power to charge rates, the effect of which would be to give them power to charge a water-rate of 8 per cent. per annum on the property they supplied; and in other respects it was felt that the course of proceeding for which power was sought in the Act was of a character which the best interests of the town could not tolerate or submit to. The Urban Sanitary Authority gave notice of opposition to the Bill; and a meeting was convened—not because the law absolutely, under the circumstances, required it, but because the Mayor and the whole of the Council felt that it was a large undertaking, and that it would be desirable that the public, at all events, should have the opportunity of expressing their views upon the subject generally—a public meeting was convened by the Mayor, and the result was, that resolutions were passed—after I had made a statement to the effect that certain negotiations had, through me, by direction of the Water Supply Committee, been going on with the Water-Works Company—recommending that amicable terms should be come to. The feeling of the meeting was perfectly unanimous that such a course of proceeding would be far better to be carried out than that an expensive and costly opposition should be entered upon, the result of which would be that whenever the Corporation should—and all recent legislation seemed to point to the absolute necessity of their so doing—acquire the water-works property, they would have to pay the costs of both sides. It was felt that it would be better to purchase the undertaking if it could be obtained on fair and equitable terms, and the course of opposition was moulded afterwards to carry out those wishes of the ratepayers, which, I am bound to say, were from first to last the ideas of the Council. The opposition was started in no spirit of opposition, so to speak, but for the purpose of seeing whether they could not, for the benefit of the ratepayers, acquire the property as trustees for the public. When the Bill was presented to the House of Commons we gave notice of opposition in order to obtain *locus standi*, and it ultimately resulted in both Houses suspending the Standing Orders and allowing us to add to the Bill a provisional agreement which the Corporation had entered into with the Directors of the Company, and when the Bill was passed, that agreement appeared as a schedule to the Act. It is upon the basis of that agreement, as sanctioned by both Houses of Parliament, that the Corporation are now anxious to borrow, in the interests of the public, a sufficient sum of money to enable them to pay the purchase. The cost, it is believed, will be between £50,000 and £60,000, but the agreement requires that the amount shall be 25 years purchase of the net profits of the year ending the 30th of June last. The accounts will not all be got in for a week or two; and, of course, till that has been done we are left in the dark to a certain extent as to what the amount of the purchase money will be.

The Inspector: It is to be 25 years purchase of the net profits.

The Town Clerk: And 10 per cent. added for compulsory purchase.

The Inspector: In addition to any capital expenditure during the past year.

The Town Clerk: Yes, unproductive capital. As far as we can ascertain, the cost will be between £50,000 and £60,000. As long as it does not exceed that amount I am sure I am expressing the feeling of the ratepayers when I say they will consider it a most advantageous purchase.

The Inspector: By the Act I think it is left to arbitration to fix the net profits, is it not?

The Town Clerk: Yes; and we have appointed, as our Arbitrator, Mr. Easton, a gentleman of great eminence, who has consented to act on behalf of the Corporation. I am informed that Mr. George Wilson Stevenson will be appointed to act on behalf of the Company.

The Inspector: I do not see how I can recommend the sanction of a loan; there is no information as to the sum you actually require.

The Town Clerk: We have no precise information as to the sum we actually require. In my letter to the Local Government Board, I told them it would probably amount to £50,000 or £60,000, and they stated that for the purpose of this inquiry they would treat the sum required as £60,000. We do not propose to borrow, in this form at all events, more than £60,000 under any circumstances. The Local Government Board are not left in the dark; they are told that it is a speculative inquiry.

The Inspector: I am afraid I shall have to report on something more substantial than speculation. The Board will not sanction the raising of money unless it is clear to what purpose the money is to be applied.

The Town Clerk: The purpose is the purchase of the water-works, santioned by Parliament.

The Inspector: That is all right, but they will want to know exactly the sum required.

The Town Clerk: It seems to me that the Board, then, have held their inquiry somewhat prematurely. But they have not been kept in the dark by me with regard to the facts, as they themselves admitted in a letter dated so lately as the 26th of July. They say:—"The amount of the purchase-money is apparently to be determined by arbitration, so it would seem at present it cannot be determined what the amount is."

The Inspector: If you carry out further works the Board will require those works to be specified, and estimates submitted, and all that kind of thing.

The Town Clerk: Of course we should do all that. In any extension of works, or purchase of additional land, we should, of course, submit the plans to them.

The Inspector: Does the Act give you any power to borrow; and, if so, what amount?

The Town Clerk: We can borrow with your sanction. We have only borrowed, with the sanction of the Board, £5000 heretofore; so with that exception we have a clean sheet.

The Inspector: What power does the Act give you to borrow? What amount can you borrow under the Act?

Alderman C. H. Hawkins: £35,000.

Alderman P. O. Papillon: That is what the Company asked for.

The Town Clerk: There is no provision limiting the power of the Local Sanitary Authority under the Act at all.

The Inspector: No power limiting; but is there any clause granting power?

The Town Clerk: Not to the Local Authority. We are borrowing under the powers of the Public Health Act, 1875.

The Inspector: I know; but we must not have the two complicated. If the Act gives you any power to borrow, and you first borrow under the Public Health Act, you would fall back on this in addition.

The Town Clerk: There is no power given.

The Inspector: If you purchase the property then, do you purchase it with the powers granted by the Act in addition?

The Town Clerk: No. Sub-section 2 of section 53 says: "None of the provisions of this Act in any manner relating to the share or loan capital of the Company, or to any limitation of the amount to be received by the Company or undertakers, or to the constitution, meetings or Directors of the Company, shall apply to the Urban Sanitary Authority."

In answer to further questions, the Town Clerk said that the original capital of the Company was £35,000, and they asked power in their Bill to raise and expend £35,000 more. Then there was a power to borrow £8000 on mortgage. If, therefore, the Council did not buy the works, the Company would have power to deal with £78,000. They submitted to Parliament an estimate of how the proposed additional capital would be spent.

The Inspector: Then in your application for £60,000, can you divide that at all—as to what portion of it you expect to have to pay the Company, and what portion will be required for extension of works?

The Town Clerk: We apprehend the whole of the £60,000, or the whole sum of between £50,000 and £60,000, will have to be paid to the Company. This is not an application for extension of works, but an application for power to borrow to pay the purchase-money.

The Inspector: When do you expect the Arbitrators will meet?

The Town Clerk: I should think within a fortnight, or three weeks at the outside—as soon as I can hear that the Company have collected their June water-rates. We have not the materials to arbitrate upon at present.

The Inspector: And the Arbitrators must give their award within two months of that date. That will be about the middle of November.

The Town Clerk: Yes; but I should like to observe at this stage that we shall press them the moment they have the materials ready to get the Arbitrators to work as soon as possible, and for this reason: By the terms of the agreement we have to pay interest at the rate of 5 per cent., and we can borrow the money at 4, and possibly at 3¾ per cent.

The Inspector: You wish to pay the money as soon as the award is out?

The Town Clerk: Certainly. And there is another reason why we should wish to pay it as soon as ever the award is out, which is—that it has been stated to us that the rates actually exceed 5 per cent. upon what we shall have to pay. So it is not only the difference between 4 and 5 per cent. we should be saving by expedition, but the profits above 5 per cent., which may be another ½ or perhaps 1 per cent.

The Inspector: I should like to know whether there is any objection on the part of any ratepayers to the Local Government Board giving their sanction to the loan.

The Town Clerk: So far as we know, the thing is unanimously approved of in the town. We have not heard the direct expression of a single opinion in opposition to it. We have had two public meetings upon the subject, convened by the Mayor, and the thing has been thoroughly well ventilated for months and months.

The Inspector: Then all I can do is to report that I held this inquiry, and that you could not get the information that was requisite to enable me to recommend the Local Government Board to give their sanction for the borrowing of any definite sum, but you stated the sum you anticipated would be between £50,000 and £60,000, and wanted sanction for a sum within the limit of £60,000.

The Mayor (Mr. T. Moy) asked whether, in the event of the sum exceeding £60,000, the Inspector considered that another inquiry would be necessary?

The Inspector; I am afraid so. I can only ask the ratepayers whether they have any objection to the sum of £60,000. They say no, and it would be for the Local Government Board to say whether another inquiry was necessary.

The Mayor having thanked the Inspector, the proceedings terminated.

Tamworth Water Supply.—During the past four months the Sanitary Authorities of Tamworth have been engaged, under the advice of Mr. Henry J. Marten, C.E., of Wolverhampton and London, in sinking a well at Hopwas, a village about two miles out of Tamworth, on the Lichfield Road, for water supply purposes. The well is about 170 feet deep and 10 feet in diameter, securely brick-cased from top to bottom. Last Friday morning the first shot struck upon a spring of water, the yield of which is reckoned at over a million gallons a day. Whilst this discovery confirms the judgment with which the spot for sinking was selected, it is good news for the large and increasing population in and around Tamworth. It ensures to them the acquisition of a cheap and economical water supply of more than double the quantity which the Engineer estimated as sufficient for the wants of the district.—*Birmingham Daily Post.*

THE DISPOSAL OF THE SEWAGE OF ROCHDALE.

Local Government Board Inquiry.

Last Wednesday, Mr. J. T. Harrison, one of the Inspectors under the Local Government Board, attended at Rochdale to hold an inquiry in reference to an application on the part of the Corporation for sanction to borrow £112,000, to carry out a scheme for the interception and purification of the sewage of the borough.

Mr. Leresche, instructed by the Town Clerk, conducted the case in support of the application; Mr. C. J. Roberts appeared for the Rochdale Merchants and Tradesmen's Association, and for Messrs. Henry Tucker and Co., of Sudden Brow; Mr. J. Farrar, C.E., of Bury, for Mr. Tweedale, of Roach Mills; Mr. J. Hartley for Mr. Lord of Hill House and Mr. Seed, an owner on the Sudden Brook; Mr. R. Jackson for Messrs. Abm. Brierley and Sons, Limited, and Messrs. John Chadwick and Sons, of Oakenrod Mills; Mr. W. Stott for Mr. A. H. Royds; and Mr. W. Taylor represented, as President, the Rochdale Property Owners Association. There was also present Mr. R. Vawser, C.E., of Manchester, the Engineer appointed by the Town Council to supervise the plans and consult generally on the scheme proposed.

Mr. Leresche, after mentioning the object of the application, said that the present estimated population of the borough was between 71,000 and 73,000, and the annual gross assessable value of the property comprised within it was £307,792. The net rateable value, after the deductions for land, &c., were made, was about £249,760, and under the second section of the Act the Corporation might have power given them to borrow to the extent of double that sum. The question arose as to the outstanding loans contracted under the Sanitary Acts. No money had been borrowed by the Corporation under the Public Health Act, but under previous Sanitary Acts an amount had been borrowed which left £83,170 still outstanding, and of amounts borrowed for sanitary purposes under special Local Acts there was outstanding a sum of £419,068. The amount for which the present application was made was £112,000, which it was proposed to expend upon works of sewerage and sewage disposal. Under the 234th section of the Public Health Act the money might be borrowed for such a period, not exceeding 60 years, as the Local Authority with the sanction of the Local Government Board might determine. With respect to that, he was instructed to refer to a point which, though it could not be dealt with at the inquiry, it was only fair and just should be mentioned. By the Rochdale Improvement Act of 1872, the Legislature had fixed 75 years as the period for the repayment of the money authorized to be borrowed under that Act for purposes other than water-works. The Local Government Board had no power to extend the time fixed by the Public Health Act—namely, 60 years—but they had power to alter and amend any Local Act; and seeing that the works of sewerage now proposed were works of a permanent and enduring character, he thought it only right to mention to the Inspector that an application would subsequently be made to the Local Government Board for them to exercise their powers to increase the borrowing powers under the Local Acts, so that this sum of £112,000 might be repayable in 75 years, the same as the rest. He would suggest, therefore, that the Inspector deferred his report to the Local Government Board until that subsequent application had been made.

The Inspector said this was a question foreign to the object of the present inquiry. The only way in which it bore upon it was in regard to the question as to whether the contemplated future application would interfere with the execution of the sewerage works, if the present application was granted. A Provisional Order would be needed to give effect to the amendment proposed by Mr. Leresche, and such an Order could not be confirmed until next autumn. It would be mischievous if the interval between now and then were lost, so far as proceeding with the works was concerned.

Mr. Roberts: It would not be lost—at least, the owners and ratepayers of the town would not consider it lost.

The Inspector said that if the Local Government Board granted the application for a loan, they would not wish that the execution of the works should be delayed until the extension of time for repayment was obtained.

Mr. Leresche: Certainly not. The Corporation are in the position of having exhausted all their borrowing powers, and they are helpless to proceed with any works until further powers are granted them.

The Inspector asked what was the character of the works in respect to which the Legislature had allowed the loans to be repaid in 75 years.

Mr. Leresche: General sanitary works, such as paving and sewering, cemetery, baths, private improvements, expenses of town-hall, parks, night-soil removal, and gas-works.

The Inspector inquired in what way the money authorized to be borrowed by the Act of 1872 had been expended.

Mr. Leresche said that would be somewhat difficult to discover exactly, but the amounts borrowed on the different funds and still unpaid, as shown in the accounts made up to March last, would give the information approximately. These sums were as follows:—Gas account, £167,349; paving and sewering, £4157; general purposes, £68,094; cemetery, £16,029; baths, £6983; improvement, £47,647; town hall, £140,307; and private improvements, £45,040. These were the outstanding liabilities after the annual 75th parts had been repaid.

The Inspector said if he understood those figured correctly, it appeared that a sum of only £4157 had been borrowed for paving and sewering purposes—money expended on private improvements could not be so reckoned; and it seemed rather an extraordinary thing to ask, under those circumstances, for an alteration of the Act to enable them to distribute the repayment of the £112,000 over a period of 75 years.

Mr. Leresche said the audited accounts showed that at the end of March last the Corporation had unexhausted borrowing powers amounting to £17,619, but during the five months that had since elapsed this sum had been absorbed, and the Corporation had no power to borrow further without an Order.

The Inspector: And that Order can only be for 60 years. You must get an Act if you want it for 75 years.

Mr. Leresche remarked that since the Inspector was there last, Mr. Vawser had gone through the plans, and they had been most carefully revised. Detailed estimates had also been prepared showing the cost of the works, and when evidence had been given on those points, he apprehended it would complete the information which the Inspector would require in regard to the matter.

The Town Clerk, remarking upon the time during which the asked-for loan would have to be repaid, said they desired the time to be extended and made co-equal with that named in their Local Acts—namely, 75 years. The borrowing powers of the Corporation were exhausted, and he had been empowered by the Council to make application to the Local Government Board—and should do it during this week—for power to contract further loans to the extent of £140,000, quite irrespective of the application now before the Inspector. These further loans would have to be granted by Provisional Order, and he wished the Inspector to suspend his report so that the whole matter might be dealt with by one amendment of their Local Acts, and the period of repayment in respect to the £112,000 advanced from 60 to 75 years. The town was very heavily in debt, and how its payments were to be made, under the present aspect of affairs, he hardly knew. He submitted that while they were applying to have their Acts amended the sum needed for sewerage works might be included in it.

The Inspector said the difficulty was the delay which would be caused. A Provisional Order could not be confirmed until next session. Besides, the point was one quite apart from the object of the present inquiry, and would have to form the subject of a subsequent one.

Mr. Roberts: Why not go to Parliament, and let the parties who made the Act amend it? It is quite as easy to go to Parliament as to go for a Provisional Order.

The Inspector: But far more expensive.

Mr. Leresche remarked that in 1872 the Corporation went to Parliament for sanction to a complete scheme for the disposal of their sewage. That scheme was, however, thrown out. After their experience in respect to that application, the Corporation wished to get the powers sought through the Local Government Board rather than embark in a most expensive, and, perhaps, most disastrous parliamentary campaign. At present the rates of the town were about 7s. in the pound, and the question of whether this £112,000 was to be repaid in 60 or 75 years meant an extra 2d. or 3d. in the pound on the rates.

The Inspector: If the time can be extended by Provisional Order, no doubt the ratepayers will be benefited.

Mr. Vawser, C.E., explained at some length the details of his scheme, which provides for 20 miles of intercepting sewers and a main drain. The scheme is designed to meet the requirements of a population of 200,000, the present population being 72,000. The largest sewer would be 9 feet in diameter. The gross estimate for the sewers was £74,877, and £37,000 for preparing a sewage farm for the disposal of the sewage. Land to the extent of 27 acres had been secured on the confines of the borough near the Roach, for dealing with the sewage, at a cost of £250 per acre. The tanks would cover about 5 acres, and 15 acres were intended to be irrigated by gravitation. The Corporation intended to deal with the sewage in the same way as at Kendal. They wished to clarify the sewage by subsidence.

Mr. Hewson, Borough Surveyor of Rochdale, who originally drafted the plans, also gave evidence in support of the scheme.

Mr. Tweedale, Mayor of the borough for the years 1877-78, and owner of land adjoining to that purchased by the Corporation for the sewage scheme, submitted another scheme, which was prepared by Mr. J. Farrar, C.E., Bury, and which it was alleged would be cheaper than Mr. Vawser's plan.

Mr. Leresche read a report upon Mr. Farrar's scheme, prepared by Mr. Vawser and Mr. Hewson, showing that this was not the case.

After a prolonged inquiry, Mr. Harrison inspected the land which had been secured by the Corporation for dealing with the sewage.

THE LANCASHIRE COAL AND IRON TRADES.

(FROM OUR OWN CORRESPONDENT.)

In the coal trade of this district there is little or no material change to report. There is still but a limited demand for all descriptions of fuel, and it is only in exceptional cases where the pits are working much more than half time; whilst prices continue quite as low as ever, colliery proprietors, indeed, in some cases, offering at under current rates for delivery this month. In house-fire classes of fuel there has been a little more doing, in consequence of buyers purchasing rather more freely in anticipation of the possibility of an advance in prices next month. For gas coals there are now very few inquiries so far as any fresh business is concerned, but where any orders have been recently given out, they have been at extremely low figures. Consumers, however, are beginning to press for deliveries on account of contracts, and some of the gas coal collieries are now kept pretty busy supplying the requirements of their customers. Rather more of the common classes of round coal for steam and forge purposes has been taken by works; but the improvement in this direction is yet so very slight as not to be felt in the market. Burgy is still bad to sell, owing to so many of the mills being either stopped or put on short time; and slack, notwithstanding the lessened production of this class of fuel, is not generally scarce in the market. The quoted prices are without change, and may be given about as under:—Best Wigan Arley round coal for house-fire purposes, 8s. to 8s. 6d. per ton; common qualities, 6s. to 7s. per ton; Pemberton four feet, 5s. 9d. to 6s. 3d.; common round coal, 4s. 6d. to 5s. 3d.; burgy, 3s. 9d. to 4s. 3d.; good slack, 2s. 9d. to 3s. 3d.; and common ditto, 2s. to 2s. 6d. per ton.

In the shipping trade there has been a little more doing, but the prices which have now to be taken to secure cargoes are so extremely low that many colliery proprietors do not care to compete for this business.

The coke trade continues very dull, and the slight improvement which was noticeable a week or two back has not been maintained so as to have any effect upon prices, which for good cokes at the ovens remain at about 14s., and for small cokes 10s. per ton.

In the iron trade, sellers continue firm at the late advance in prices, but there is a falling off in the amount of business doing. Local makers of pig iron being pretty well sold forward are not very anxious at present to push for further sales, and only a few small orders are coming into their hands. Finished iron makers are endeavouring to obtain more money, and for some classes of iron, such as hoops and plates, an advance upon late rates is being paid; but bars, as a rule, do not command much better prices. The quoted rates for delivery into the Manchester district are about as under: Lancashire pig iron, No. 3 foundry, 47s.; No. 4 forge, 46s. 6d. per ton, less 2½ per cent.; good Lancashire bars, £5 10s. to £5 15s. per ton.

Engineers, founders, and merchants are doing very little.

THE COAL AND GENERAL TRADES OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

Every week now shows a slightly improved demand in the gas coal trade. Shipments of best qualities increase steadily. A few more boats have been taken in for voyages to load gas coals for London and some of the other ports. The second-class gas collieries show an improvement in trade. Generally speaking, as I reported last week, the business has got into the ordinary September run.

Coasting sailing tonnage was rather scarce last week. An advance of something like 3d. a ton was made for freight by many handy little sailing vessels. Probably this rate will be established, as this is the season of the year when the smaller gas-works in the Eastern Counties and in the English Channel begin to lay in stock. Prices, it is needless to state, are unchanged. The loading turns for best gas were fully filled up last week. Turns were given for this week. The shipments will be large, it is anticipated. A considerable amount of steam tonnage has been taken in to coal for this week. They clear out a quantity of coals with amazing rapidity in the course of three or four days. The Continental demand for gas coals is about the average. Cargoes are being sent off to Holland, Hamburg, and the North of France. The residue of the Baltic contracts are being got away. Outward freights, coastwise, and, indeed, to all parts of the navigable world, keep moderate, as I anticipated that they would. The course of business favours the shippers. The Channel rates paid sailing

ships to load gas coals have been—Poole, 5s. 9d.; Newhaven, 5s. 6d.; and Teignmouth, 5s. 9d.

General business was quiet and dull last week. The lead trade had several sales. Red lead is selling at £15 10s.; best pig, £15; £16 ordinary lead pipes, and £15 10s. per ton sheet lead. There is a moderate demand for timber. Swedish and Norwegian wood is not much asked after. A reasonable amount of business has been got through amongst the superior qualities of timber. The better sorts of fire clay goods continue to be shipped abroad. Parcels of high class fire bricks have been sent out to Australia from Blaydon. The shipments to most other parts of the world have been good. There is a large demand for sewerage pipes for the Continent. A great quantity is shipped. The iron trade is quiet. Most classes of manufactured iron and foundry work are slack. The shipments of coke are dull for most parts. The local demand for coke is poor. The chemical trade is pretty steady, though there was a slight falling off in business last week. The price of one or two articles of chemical manufacture was slightly lower.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

Following the example of the Glasgow Corporation Gas Commissioners, the Directors of the Partick, Hillhead, and Maryhill Gas Company have resolved to reduce the price of gas from 4s. to 3s. 10d. per 1000 cubic feet, the reduction to count from the inspection of meters last May.

The Paisley Corporation Gas Commissioners, at a meeting held last Monday, agreed to a motion, by Bailie Halden, to take from the surplus gas-fund the sum of £1871 12s. 3d., for the liquidation of the debt on the Brodie Park. It was stated that a sum of no less than £13,000 stood at the credit of the gas-fund; and Treasurer Russell, in seconding the motion, said that, even if they reduced the price of gas 5d. per 1000 cubic feet, he was satisfied there would be a surplus of from £2000 to £3000 next year. Last month's consumption of coals in the works was 428 tons, and the illuminating power of the gas produced was equal to 28·21 standard candles.

The arbitration connected with the acquisition of the Elgin Gas-Works by the Town Council "drags its slow length along." Some three or four weeks ago, the Arbiters, who are, I think, ex-Provost Robertson, of Dundee, and Mr. George R. Hislop, Gas Engineer, Paisley, had a meeting on the subject, when it was resolved that claims and answers thereto should be adjusted and lodged. It will thus be seen that there is some progress being made, however little. The Wishaw arbitration case seems to have gone asleep.

The annual general meeting of the Carnoustie Gas Company was held a few days ago, when it was resolved, on the recommendation of the Directors, to declare a dividend of 7½ per cent. on the capital stock of £5000.

At a meeting of the Town Council of Edinburgh, held last Tuesday, the following motion by Mr. Gowans was submitted—"That it be remitted to the Cleaning and Lighting Committee to consider and report as to the desirability of having Princes Street lighted with improved lamps." Bailie Colston said he did not object to this remit; but in view of the position in which the question of street-lighting now stood, he thought it would be undesirable to enter into any large expenditure in connection with the lamps in Princes Street. The Thames Embankment, as they all knew, was now illuminated with the electric light, and no street in the world was better adapted than Princes Street for the use of this light. Mr. Gowans said the Committee might inquire into this question. Bailie Rowatt agreed with Bailie Colston in thinking that, at present, the city should not expend so large a sum as would be necessary—about £1000—for the improvement of the Princes Street lamps. The remit was agreed to without further discussion.

The Arbroath Police Commissioners, at their meeting held last Monday, had under consideration the lighting of the public lamps, of which it was reported that there were 446 in the town, the average cost of which was 18s. 7½d., or a total of £414 11s. 4d. In all they burned 1,270,627 hours.

A meeting of the Paisley Water Commissioners was held last Monday, when the Water Committee reported that 33 tenders for the construction of the new Glenburn reservoir had been received and considered. They ranged from £8456 18s. 9½d. to £22,847 1s. 6d. Six of the lowest had been sent to Messrs. Leslie, Engineers, Edinburgh, for their consideration. It was eventually resolved by the Commissioners to accept the tender of Mr. Peter Quin, Glasgow, the amount being £10,070 1s. 3d. Messrs. Leslie recommended another firm, but their views were over-ruled.

The Lochgelly (Fifeshire) Police Commissioners have resolved on carrying out a water supply scheme, the tender for which was accepted last Monday, the amount being £4227 5s. 8d.

On the motion of Councillor Garland, the Edinburgh and District Water Trust, at a meeting held last Thursday, ordered a return showing—(1) the estimated cost of the Moorfoot scheme; (2) the actual cost up to the present time; (3) what further sum it is estimated will be necessary to complete the works; the return also to show the various sums paid for Acts of Parliament, purchase of land, construction of works, legal charges, engineers fees or commission, and other details of expenditure. The last fortnightly return issued by the Trust states that on the 9th inst. the total quantity of water in all the reservoirs was 2,076,185,000 gallons, being a decrease of 359,713,000 gallons as compared with the previous return. The present delivery is at the rate of 46·23 gallons per day per head of the population.

There was a good deal of excitement in the Glasgow pig iron market last week, and a large business was done. Business was effected on Friday at 47s. 6d. cash, and at the close the quotations were 48s. cash for sellers, and 47s. 11d. for buyers. The advance on the week was 1s. 9d. per ton.

The coal trade is also excited somewhat, and prices are decidedly firmer.

EXHIBITION OF GAS APPARATUS AT GREENOCK.

(FROM OUR OWN CORRESPONDENT.)

Some months ago it was resolved to hold an Exhibition of Gas Apparatus in Greenock, under the auspices of the Corporation of that enterprising town, and of the Museum Committee of the Watt Institution, which was founded to commemorate the great inventive triumphs of James Watt, Greenock's most distinguished son. The special object aimed at in holding the exhibition was to give the public an opportunity of becoming familiar with the various appliances recently introduced for the purpose of utilizing coal gas as a simple and economical motive power, and also as a cleanly and efficient source of heat for cooking. It was also the aim of the Committee to give an opportunity for the exhibition of improved burners, globes, gas regulators, and other appliances for the economic use of gas as a lighting agent.

The large and influential Committee that was appointed to carry out the objects aimed at, forthwith set to work, and very hearty co-operation was met with in many directions. It is scarcely necessary to say that a large share of the work fell on the shoulders of Mr. Samuel Stewart, the Superintendent of the Greenock Corporation Gas-Works, who was appointed to the responsible post of Honorary Secretary of the exhibition. In carrying out his executive labours he was heartily assisted by Mr. Thomas Struthers, the Curator of the Watt Museum. The result is that a most extraordinary and valuable collection of objects of interest has been brought together in the Lecture Hall of the Watt Institution; and on that account, as well as from the fact that the exhibition is the first thing of the sort ever yet held in Scotland, it is exciting, and is likely to continue to excite, a large amount of attention, both amongst Greenock people and amongst people in Glasgow and other places at a distance. Considering the fact that so many gas exhibitions have been held in various towns in England, it is a matter of very great surprise that Greenock, rather than Edinburgh or Glasgow, has been the first town north of the Tweed to take up the idea and to carry it out to a successful issue. This circumstance certainly redounds much to the credit of Greenock.

The exhibition was opened last Tuesday evening under somewhat auspicious circumstances, there being present on the occasion a very large and distinguished company of ladies and gentlemen.

Provost Lyle delivered the opening address. He said it would not do for him to expatiate on the advantages to be derived from the use of gas, because they would have them illustrated in a much more effective way in the adjoining hall. Gas—the uses of which would be exhibited before them, and which were many and varied—was more economical, more cleanly, and had many other advantages which might well commend its use over the fuel of the ordinary fire. Perhaps it was peculiarly suitable to have such an exhibition at the present time, the more especially when the question of going back upon a more economical mode of living than what they had drifted into of late was being seriously entertained by many. There could be no doubt, therefore, that the exhibition would do good in its way. They all knew that coal for domestic purposes was no small item in a household; and if it could be shown that by the use of gas greater economy and greater cleanliness were secured, he thought the exhibition was certainly a step in the right direction. After referring to Mr. Stewart, M.P., who was present and was about to address the meeting, he reminded the compnay that many of the exhibitors had come from a great distance and at great expense to show their exhibits; and he hoped that the entertainment provided by them would show people how to live more cheaply and more economically.

Mr. Stewart, M.P. for Greenock, then addressed the meeting. He said he was glad to learn that it was not for the purpose of hearing speeches that they had met together that night, but for something far more practical—for the purpose of examining the exhibition which had now commenced in the adjoining hall. He referred in a few remarks to the museum, and spoke of it as a most fitting adjunct to the memorials of their great townsman, James Watt; and then he proceeded to say that they were soon to see an excellent collection of apparatus for making greater use of gas than hitherto had been done, in the way of cooking and various other ways. For himself, he had always looked on Greenock gas as of a superior quality, and freer from some of those very noxious flavours which he had observed sent forth from the gas in Edinburgh, London, and other places. He must say that, in his own experience, so far as what he had seen of meat cooked by gas, there always seemed to be something left behind which one would rather be without. But he understood that this was by no means necessary, and that some of the apparatus they were about to inspect enabled them to avoid this objectionable flavour. Some time ago, in London, he further remarked, there was great perturbation amongst the gas companies, as they feared that they were about to be eclipsed by the electric light, and the shares of all the companies went heavily down. He did not know whether his friends of the Greenock Corporation had any fears about the gas-works revenue; but he only knew that it was a good spoke in the wheel, from those admirable statements which the Provost was accustomed to lay before his audiences when he made his yearly financial statements. He thought the Provost need have no cause of dread of a decrease of revenue by the adoption of the apparatus about to be inspected, but that it would be rather a source of increase.

Dr. Marshall, as Chairman of the Museum Committee, thanked the Gas Committee of the Police Board for so handsomely giving a gratuitous supply of gas for the purposes of the exhibition. He thought that the exhibition would satisfy every one that a great deal more could be done with gas than they had been in the habit of doing. Many people had expressed a fear that the coal-fields of the world would come to an end; but if there should be any such fear, he thought that such an exhibition as the present would dispel it. It would stimulate a more economical use of coal. By the present wasteful way of cooking, a great deal of coal was wasted, whereas if the gas were first extracted, and the coke used, a much more economical use was made of the coal. He did not think there was much fear that the coal-fields would be exhausted, but if they should be, the world was packed with carbon and hydrogen, the constituents of coal, and he had no doubt means would be found of uniting them. He recommended to them the adoption in all of their houses of cooking stoves, for use especially in summer.

Bailie Shankland replied, and in acknowledging the vote of thanks passed to the Gas Committee, he said he was sure that in giving the gas gratis they had acted in a way that would meet with the approval of the whole community.

Sheriff Smith, in moving a vote of thanks to Provost Lyle for presiding, made humorous reference to some of the circumstances attending the superseding of oil by gas.

The Provost replied, and said that he was one of those who had no fear whatever that the revenue of Greenock would soon be lessened by a failure in the gas, notwithstanding all that they had heard about the lime light and electric light, and light to be had out of water. He was afraid they would still have to depend in a great measure on the good old gas-light which had lighted them for the last fifty years in a way which could not be too highly prized.

Subsequently the ladies and gentlemen present passed into the exhibition room, which was brilliantly lighted up by lamps illustrating the most recent improvements in gas illumination. Many of the cooking-stoves were in full operation. During the remainder of the week the exhibition was open from 12 till 4 o'clock daily, and from 7 till 9 in the evening. On two days demonstrations were given of the work which it is possible to do by means of a gas cooking-stove, a lady from the Glasgow School of Cookery being specially employed for the purpose; and all the attendants at the various stands where such stoves were being exhibited did their best both day and night to show how readily baking, roasting, and other cooking operations might be performed by the aid of gas as the heating agent.

As might have been expected, cooking stoves form the leading feature of the exhibition, and they certainly display an extraordinary degree of variety, alike as to modes of construction, and the amount of work which they are capable of doing. At the stand of Mr. J. Williamson, Hatton Garden, London, there is a very large display both of cooking and boiling stoves, some of which are worthy of special commendation; and the same is true of the "Cheerful" stoves shown by the same exhibitor.

The Argyle Ironmongery Company of Glasgow do not make an overawing display, as regards the number of stoves on exhibition, but the quality of those at their stand is worthy of very high praise. Such stoves as I saw at this stand are in large use at the well-known cooking depôts

established in Glasgow for the working classes; and I find that the proprietors of those establishments certify that the cost of gas for the last month was one-eighth of a farthing per lb. of meat roasted, the oven employed being at the same time large enough to do one-fourth more work. The Workmen's Dinner Society, Kilburn Park Road, London, also speak in the very highest terms of the gas ovens made by the same firm, who can boast that they have made the largest gas cooking range in use in Scotland—one capable of roasting 300 lbs. of meat at once, exclusive of that which can be cooked by boiling and baking.

A Birmingham firm—Messrs. Hassal and Singleton—through their local agent, Mr. Henry Carson, Greenock, exhibit a number of articles, the utility and low price of which are more noticeable than their ornamentation; and yet there is no good reason why beauty should not also be studied to some extent. The exhibits at this stand are chiefly cooking stoves, at least one of which is lined internally with Minton's white glazed tiles.

Mr. Hugh Watson, representing Mr. Thomas Nock, of Birmingham, exhibits a great variety of goods in which heating by gas is the leading feature of interest, including kitcheners with and without boilers, tailor's stoves, "Cheerful" stoves, conservatory stoves, &c., in most of which excellence of design and construction is very patent. Mr. Nock's reputation in connection with such goods is well established, if one may judge by the number of public institutions, club-houses, hotels, restaurants, &c., which he has fitted up with gas cooking apparatus.

It was but natural to expect that Messrs. Leoni and Co., of London, should put in an appearance at the Greenock Exhibition, and they do so in strong force. Through their local agent, Mr. John Findlay, Greenock, they make an excellent and most interesting display of a very varied character. The "Nonpareil" family gas-kitchener brought out by this firm, and for which they were awarded a silver medal at the Birmingham Exhibition, attracts a great deal of attention from the visitors. The same piece of apparatus is in extensive use at the cookery schools established in England and Scotland during the last few years. Mr. Dorning, Master of the Greenock Club, had a 12 lb. roast cooked in one of these stoves last Tuesday, and not only was it beautifully done, but it was done with a loss of only about 1 lb., while the cost for the gas consumed was only a penny or so.

Mr. Charles Wilson, of the Carlton Works, Leeds, makes a really excellent display of a selection of his well-known goods. One of his "Eclipse" kitcheners is very greatly admired, and it seems well entitled to the character which it gained in connection with the late Exhibition of Gas Apparatus at Leeds, when the maker was awarded a certificate signed by Mr. Henry Woodall, which may well be prized. Another exhibit at this stand is a cooking-stove capable of preparing a dinner for 200 persons, including the roasting of 150 lbs. of meat. It is scarcely necessary to describe these exhibits.

Messrs. Watt and Son, Washington Works, Glasgow, who are largely engaged in the manufacture of Crossley's "Otto" gas-engines, are the exhibitors for Messrs. Siddaway and Sons, West Bromwich. The leading features of their stand are "Cheerful" stoves and cooking stoves, all of excellent design and make.

A local exhibitor—Mr. W. W. Christie, of Glasgow—shows two very successful applications of gas in cooking operations, the results of long practical experience in this branch of applied science. One of them, quite a new arrangement, is a double oven kitchener, with five boiling rings on the top, the baking chamber or oven proper having an internal area of 12 inches by 20 inches, while that of the roasting chamber is 18 inches by 20 inches. The burners on the top embody a novel application of the Bunsen principle of burning gas, and they are specially adapted for economically using the rich cannel gas which is so generally manufactured in Scotland. This cooking range is so well devised for utilizing the heat of combustion, both on the top and in the cooking chambers, that the exhibitor speaks confidently of its capacity for cooking a complete dinner —including fish, game, pastries, &c.—for at least 30 persons. The other exhibit is the "Gem" gas cooking range, which is likewise new, and is specially adapted for use in a small family. It is capable of preparing a roast of meat, baking a pudding or pie, and has the necessary facilities for boiling or stewing on the top, the whole work of cooking the dinner being done at the trifling cost of 1d. per hour for gas.

Mr. James Fielding, Salford, has an interesting stand, the objects on which are all more or less connected with the economic consumption of gas; but generally speaking they are not so fully identified with cooking by gas as some of the other collections already referred to or yet to be noticed.

A highly creditable display is made by Messrs. Beverley and Wilde, of Leeds, a firm whose experience in exhibitions of gas apparatus is now very considerable. Several of their exhibits combine some excellent devices, such as to lead to a much larger consumption of gas for cooking and heating purposes. I would more especially allude to the lining of "Minton" tiles, backed with non-conducting material, in their "Leeds" patent gas cooker, and to the application of the Bunsen principle in the same, by which the full calorific effect is obtained from the gas consumed.

One of the most attractive stands in the Exhibition is that of Messrs. Billing and Co., London. Some of the exhibits in their collection are specially designed for taking advantage of the present domestic arrangements for heating, but substituting gas for coal as the heating agent. An excellent example of this is seen in their "Sun-Dial" brass heating stove, which is brought out this season for the first time. Their "Sun-Dial" special griller, which was so much run on at the Leeds Exhibition, excites a great amount of interest amongst the Greenock people, as, indeed, does their collection generally.

Messrs. J. Wright and Co., Birmingham, have certainly one of the most complete collections in the Exhibition, the objects shown including their well-known cookers, with and without boilers; laundry stoves, tailors stoves, boiling-stoves, heating-stoves, &c.

Passing now from the appliances more specially designed for employing gas in cooking and heating purposes, I would make a pause at the stand of Mr. James Brownlie, Glasgow, who shows the only gas-engine that has been sent forward—namely, the "Bisschop" patent, of one-man power. It was intended, I believe, to have had one of the "Otto" silent engines, as made by Messrs. Crossley Bros.; but eventually it transpired that it could not be got ready in time for the Exhibition, which is certainly a great pity. However, although not a noiseless piece of mechanism, the "Bisschop" engine on view is well worthy of the attention which it is receiving from the visitors. The machine which Mr. Brownlie has in operation is driving a Schiele's fan, two small sewing machines, and a washing and wringing machine.

In connection with improved system of lighting by gas there are two very fine collections of exhibits. One is in charge of Mr. D. M. Nelson, of Glasgow, as the representative in Scotland for Mr. Wm. Sugg, London. This is certainly a most interesting series of exhibits, as it is also one of very great variety and extent. Many of the objects are of remarkable beauty, combined with utility, but their excellent features are only brought out in their fullest effect when the exhibition is lighted up at night, and it is then that they attract crowds of onlookers. Probably the most interesting object is one of the new street lamps with Mr. Sugg's Argand burner, in this case equal to 300-candle power of Scotch cannel gas. It has been resolved to erect a number of lamps of this sort in Greenock as soon as they can be supplied by Mr. Sugg, who has undoubtedly made a decided impression by his share in the Exhibition. The other stand, the exhibits on which deal with gas as an illuminating agent, is occupied by Messrs. George Bray and Co., Leeds, through their Greenock agent, Mr. John Findlay. The exhibits comprise a very great assortment of Bray's "enamel" gas burners; "special," "regulator," and "non-regulator" union jets, slit unions, and bat's-wings, together with examples of his 40, 50, 60, 70, and 80-candle power burners, and a collection of brackets, globes, chandeliers, &c.

Messrs. W. and B. Cowan, Edinburgh, exhibit gas-meters in action; and Messrs D. Bruce Peebles and Co., of the same city, have a collection of their most recent and improved forms of gas governors and regulators. Messrs. Morton and Kidd, Greenock, have in operation an example of the regulator patented by Messrs. Carnaby and Co., of Liverpool, for the safe and economical use of gas. Although in extensive use in England, this apparatus does not seem, hitherto, to have been much known in Scotland. At the stand of Messrs. G. E. Webster and Co., Nottingham, there are also a number of objects connected with the economics of coal-gas illumination. Amongst them I may specially mention their patent photometer, duplex burner, and street lamp regulator.

One of the newest inventions at present on view in the Greenock exhibition is the improved mercury-tight self-acting gas valve or governor, for the prevention of over-pressure and the consequent waste therefrom, patented and manufactured by Messrs. James Stott and Co., Bank Top, Oldham. This regulator is very effective in operation, as tested on the occasion of one of my visits to the exhibition; and I learn that from January to March of the present year it effected a saving of over 145,000 cubic feet of gas at the Glebe Mills of Messrs. Butterworth, Murgatroyd, and Stansfield, at Hollinwood, near Manchester. It has already been so successful, that the patentees intend, I believe, to adapt it for use in street lamps. It is worthy of mention that the "Stott" self-acting gas governor is largely used in connection with gas engines.

In drawing these remarks to a close, I must express the great pleasure which I have experienced in the inspection of the Greenock Gas Exhibition, and my hope that its great success may lead to similar exhibitions being held elsewhere in Scotland.

Brampton Gas Company.—From the report of the Directors of this Company for the year ending June 29, it appears that the profits of the twelve months amounted to £105 15s. 1d., which, added to the last year's balance in hand, £194 9s. 9d., indicated a disposable balance of £300 4s. 10d., out of which the Directors recommended a dividend of 5 per cent., free of income-tax, leaving £150 4s. 10d. to be carried to the credit of next year's account.

Reduction in the Price of Gas at Shrewsbury.—The report of the Directors, to be submitted to the annual meeting of the Shareholders of the Shrewsbury Gas Company, on Thursday, the 25th inst., states that the results of the last year's working have been so favourable that they have determined to reduce the price of gas to an uniform rate of 3s. per 1000 cubic feet to all consumers; and to reduce the charge for the public lamps from 66s. to 60s. per lamp per annum, to take effect from the 1st prox.

Glasgow Corporation Gas Supply.—At the meeting of the Glasgow Town Council last Thursday, the adjourned consideration of the annual report of the Committee on Gas Supply, which appeared in last week's Journal, was taken. It will be remembered that at the meeting of the Council on the 4th inst. approval of the recommendation that the price of gas should be reduced from 4s. to 3s. 10d. per 1000 cubic feet was delayed until it could be settled as to what reduction, if any, should be made in the charge for the gas supplied to the public lamps. It was now reported by Dr. Marwick that at a meeting of the Gas Committee, held that day, the following recommendations were agreed to:—First, that the price of gas for public lighting should be at the same rate as that charged for the supply of gas to the public generally; and, second, that the annual report by the Gas Committee and the Glasgow Corporation gas accounts for the year 1878-9, as submitted to the last meeting of Council, should be approved of." The Lord Provost moved the adoption of the recommendations, which was agreed to.

A Wind-Mill Pump for Gas-Works.—Mr. S. Rutter, Gas Manager, Brampton, has recently designed and constructed a wind-mill pump upon the gas-works, to keep a leaky gasholder tank filled with water. It requires no attention whatever, and works well from any quarter the wind blows. It is simple and inexpensive, and on any small works where there is not an engine, it will be of inestimable service for pumping the ammoniacal liquor up to the top of the scrubber. It is constructed as follows:—An upright rod or shaft is erected at the side of the gasholder columns with about three guides for it to work in; and at the top, above the top of the columns, there is wheel or hoop with eight cones attached to it; while at the bottom is a steel point working in a steel socket. A beveled cog-wheel is fixed to the upright shaft, and a working horizontal shaft is attached to the pump with a crank, &c. The windmill pumps the water from a beck which runs some 12 feet below the gas-works, and has now been erected more than three months. It has never stopped pumping for 24 hours since its erection, and as it moves with the slightest breeze, it performs its work in an excellent style. The only means the Company had of keeping the tank filled, previous to the erection of this pump, was by town water at 9d. per 1000 gallons, which cost the Company from £15 to £20 a year. It is, as far as we know, the only wind-mill pump erected in such a simple and inexpensive manner; and a number of people who have paid the works a visit, have expressed their pleasure at the simplicity of the machine, and the satisfactory way in which it performs its work.

Ackworth Gas Company.—The half-yearly meeting of the Ackworth, Featherstone, Purston, and Sharlston Gas Company was held on Monday, the 8th inst.—Mr. Wardman in the chair. The Secretary (Mr. Watson) read the report, which recommended a dividend at the rate of 2½ per cent., and on the motion of the Chairman, seconded by Mr. Ellerton, it was carried unanimously. Mr. Roberts remarked that, considering the depressed state of trade, it was very satisfactory. The Secretary then read the report of the Manager (Mr. Severs), which stated that the quantity of coals carbonized during the past half year was 376 tons, and the quantity of gas made 2,397,000 cubic feet. The leakage amounted to 639,200 cubic feet, or about 22 per cent., which was mainly attributed to pipes giving way at Ackworth and Snydal crossings. This was now remedied, and better results might be anticipated. As to the works, they were in a good condition. Mr. Andrews, in speaking of the leakage, fully corroborated the above statement. The Chairman, next introduced the question of obtaining parliamentary powers, and a long discussion took place. It was finally agreed that it should be left to the Directors. Mr. Roberts proposed a vote of thanks to the Chairman, and it was heartily carried. The Chairman, in responding, said that he had always made it his utmost endeavour to do everything he possibly could for the interest of the Company, and, considering the great expenditure and heavy leakage which they had been subjected to, he considered the dividend a very satisfactory one.

EXPERIMENT IN STREET LIGHTING AT BRISTOL.—Last Tuesday, Mr. B. Kitt, C.E., the Gas Engineer to the Bristol Sanitary Authority, tested, in Victoria Street, a method recently devised by him for use in connection with the street lamps of the city. The ordinary burners of the street lamps consume 5 cubic feet of gas each per hour. Mr. Kitt divides this amount of light by substituting a couple of burners consuming only 2½ feet each per hour, and between these two burners he suspends in each lamp a powerful convex lens 6 inches in diameter. By the application of this the light, without any additional consumption of gas whatever, is said to be increased nearly 50 per cent. In the experiment on Tuesday night three lamps at the Bristol Bridge end of Victoria Street were fitted up with Argand burners so accurately adjusted that only the exact quantity of gas—2½ feet per hour—was consumed by each. At the other end of the street the ordinary bat's-wing burners were tried, a couple being affixed to each lamp. In this rough experiment some delicacy of adjustment was required to get the exact focus for the reflector, but the success of the new system is reported to have been beyond all doubt. The Argand burners were more steady, but for all practical purposes the ordinary bat's-wings were sufficient. It is stated that this winter the whole of the city may be lighted on Mr. Kitt's plan.

IMPROVEMENTS AT THE SOUTHAMPTON GAS-WORKS.—There have recently been completed at the Southampton Gas Company's works some extensive improvements for facilitating the discharge and storeage of the cargoes of coals required in the manufacture of their gas, and these were brought into operation last Thursday. The improvements consist of a viaduct the whole length of the jetty or wharf, which has been strengthened by the addition of some hundreds of piles and other timbers, on which are firmly bolted the cast-iron columns supporting the deck of the viaduct. The road between the gas-works and wharf is crossed by a draw-bridge on wheels, constructed in the strongest manner possible; and on this bridge and viaduct is a series of tramways communicating with other tramways constructed through the stores and works, traversing every part, and thus enabling the coals to be deposited at any point. On the viaduct are two powerful steam-cranes for hoisting the coal, weigh-bridges for the weighing of the coals, and at certain points of the tramways are turn-tables to enable the coal waggons being turned in any desired direction. By this system of working it is estimated the Company will be able to unload and store the coals at the rate of a ton per minute, the whole being a well-conceived and planned arrangement, greatly facilitating the discharging of cargoes without the employment of horses and carts as heretofore. The construction of the work was carried out from designs by Mr. J. B. Paddon, C.E., of Hove, the Company's Consulting Engineer, and under the superintendence of their Manager, Mr. S. W. Durkin. Messrs. Cockey and Sons, of Frome, supplied the whole of the structural ironwork.

EAST GRINSTEAD GAS AND WATER COMPANY.—The annual meeting of this Company was held on Friday, Aug. 29. The Chairman (Mr. W. V. K. Stenning), in moving the adoption of the report, said it contained an account of all that had been done in the nine months of their existence. It was satisfactory that all the shares which had been offered had been taken; and, with the exception of the unfortunate affair regarding the valuation of the land which they had been obliged to take for their water-works, everything had gone on as well as they could wish. There was some delay now in sinking the well, but the contract was so drawn that it would be completed without additional expense to them. Their Engineer was of opinion that they had a good supply of water. The balance in hand (£227) would admit of a larger dividend than the proposed 3 per cent., but the Directors thought it was not advisable to spend all their money when beginning business. The motion that the report be adopted, and the dividend, as recommended, be paid, was seconded by Mr. Fieldwick and carried unanimously. In answer to a Shareholder, the Chairman stated that it was necessary to give plenty of time for sinking the well, but they were in the hands of the Engineer, who could, if he thought unnecessary delay was being used, give the Contractor seven days notice, and take the work out of his hands. They had 700 feet of water in the well, and it was one consequence of the success as regarded the water supply which had overcome the Contractor at present. Mr. Fieldwick moved, and it was seconded by Mr. Waters, and carried, that the thanks of the Shareholders be given to the Chairman and Directors for their services during their tenure of office, and that their discretion in only declaring a moderate dividend be approved of. The Chairman, in reply, said they had every prospect of an increased consumption of gas, from the rapid growth of the neighbourhood; and a good demand for water, as soon as they could supply the public with it.

THE PURCHASE OF THE CARDIFF WATER-WORKS BY THE CORPORATION.—At the meeting of the Cardiff Town Council, on Monday, the 8th inst., the Parliamentary Committee reported that the Town Clerk had been in communication with the Public Works Loan Board as to a loan of £300,000 for the purchase of the water-works. The Board informed him that, in the event of the loan being granted, the rate of interest would be 5 per cent., and the principal would be required to be repaid by half-yearly instalments in not exceeding 20 years. Alderman Winstone, referring to this report, said it seemed that there was very great difficulty in getting the necessary money for the purchase of the works. There appeared to be only one place where it could possibly be obtained, and that was upon such conditions as the Council could not for a moment entertain. He believed nothing would be more ruinous than agreeing to such a proposition—indeed, he thought it would be better to give the Water Company £10,000, and abandon the scheme altogether. If the money were borrowed at 5 per cent. interest, and to be paid back in 20 years, it would amount to an enormous charge upon the ratepayers—for £400,000 would be required, at all events. By what, he asked, would the town be recouped for this expense? The Committee did not inform the Council what revenue was derived from the works last year. But if they went to the year before—the year 1877—they would find, he believed, that the whole of the money from every source collected by the Company was under £17,500. He did not suppose it was quite so much now, for though, on the one hand, the population of Roath and Canton had increased, it must be remembered that the charges had been reduced. In the absence of better information, he would say that the receipts were £18,000 a year, and the working expenses he would put at £5000 a year, leaving £13,000 a year, which would be the sum they would have to meet the interest and sinking-fund. Thus there would be an addition of 13d. in the pound on the present rates. Alderman Jones said the Committee had not, neither did they intend to accept the offer; because they believed that they could get more favourable terms elsewhere, and negotiations were being carried on with this object. In regard to what Alderman Winstone had said about the profits of the Company, he mentioned that there was an increase of £200 last half year in their profits.

BATH GAS COMPANY.—The half-yearly meeting of this Company was held on Friday, the 5th inst., when the following report of the Directors was adopted:—"The Directors submit the accounts for the half-year which ended the 30th of June last. These accounts, compared with those of the corresponding period of 1878, exhibit a favourable increase in the rental for gas from consumers by meter—viz., £1034 7s., notwithstanding the reduction in price from 3s. to 2s. 9d. per 1000 cubic feet, commencing with the half year now referred to. A corresponding reduction in price was made on gas supplied to the public lamps; but as the number of lamps have not been increased, the result is a decrease in rental of £152 2s. 8d., leaving the net increase on gas-rental £882 4s. 4d. The sale of residuals has also brought an increase of £628 4s. 3d. An increase of upwards of 17 million cubic feet of gas has been supplied to consumers by meter in the half year, caused to a great extent by the severe and long winter. This has increased the working expenses of manufacture, and the cost of distribution is also increased by renewals of mains, &c. The half-year's working has resulted in a profit of £6923 7s. 4d., less £375 interest on debenture stock, leaving £6548 7s. 4d., which, with the balance remaining after paying dividend to Dec. 31, 1878—£1892 3s. 5d.—makes the amount available for dividend £8440 10s. 9d. The Directors recommend the declaration of maximum dividends on the whole of the paid-up capital of the Company, amounting to £6112 10s., leaving a balance of £2328 0s. 9d. There has not been any outlay on capital account in the half year. The opinion of the Directors upon the electric light, as expressed in their last report, remains unchanged." The capital of the Company consists of £40,000 of 8 per cent. stock, and £95,000 limited to 7 per cent.; £25,000 of 7 per cent., and 12,500 of 5 per cent. shares; besides which there is £15,000 of 5 per cent. debenture stock. Of this £187,500 of paid-up capital, £177,076 has been expended. The cost of manufacture last half year amounted to £12,198 7s. 4d.; distribution, £1856 6s. 9d.; management, £1621 11s. 9d.; public lamps, £551 19s. 10d.; rents, rates and taxes, £908 2s. 11d.; miscellaneous, £230 12s. 7d.; or a total of £17,367 1s. 2d. The receipts included: Sale of gas, £19,668 12s.; rental of meters, £408 8s. 9d.; residuals, £4044 7s.; miscellaneous items, £169 0s. 9d.; giving a total of £24,290 8s. 6d., and leaving a gross profit of £6923 7s. 4d.

THE HALIFAX CORPORATION AND THE SUPPLY OF GAS TO THE OUT-TOWNSHIPS.—At the meeting of the Halifax Town Council on Wednesday, the 3rd inst., the Gas Committee reported that the question of a reduction in the price of gas supplied to the out-districts, had been remitted by them to their Chairman (Alderman Riley) and the Manager of the works (Mr. W. Carr), and that a report, of which the following is an extract, had been presented to, and adopted by them:—

The total quantity of gas supplied (last year) to the eight out-districts was 12,541,300 cubic feet, or, say, 12½ millions per annum. In order to supply this we have been put to an extra cost of £8860, and upon this we received a profit in 1878 of £450, say about 5 per cent. per annum on the extra outlay. It will be observed that this does not really allow any margin for reduction in the price; but, seeing that the expenditure has been incurred, and that an increase in the consumption would bring a greater ratio of profits to the Corporation, we would recommend the Committee, without altering the nominal price, to place the out-district consumers on the same footing, with regard to discounts, as consumers within the borough—a reduction virtually of 4½d. per 1000 cubic feet to ordinary consumers. This will take away the whole of the profit derived from the out-districts, but we hope the predictions of the deputation and others may be fulfilled, that a large increase in the consumption will be the result, sufficiently so to compensate the Corporation for the steps they have taken. We also trust that this will facilitate the collection of the accounts and give satisfaction to the consumers generally. As an alternative, should the gas consumers in any district consider that this is not a sufficient concession in the matter of price, we would recommend the Committee to consider proposals for the taking over of our mains, &c., at a fair valuation to any local board or public company, the Corporation agreeing to supply gas by meter at the boundary of the borough at the scale of charges and discounts from time to time in force within the borough. If the consumers in any particular district imagine that the Corporation are getting a large and exorbitant profit from the gas supply, this offer will enable them to take the matter into their own hands, and deal with it as they may think best.

Alderman Thomas moved the confirmation of the Gas Committee's proceedings, saying they thought for a time it would not be wise to reduce the price to the out-districts, seeing that the leakage outside the borough was so very large. They therefore had resolved to put those districts on the same footing as to discounts as was the borough. To do more would be to inflict a great injustice on the borough; it would be paying for the privileges of supplying gas to the out-districts. An amendment, that the price of gas to the out-districts be reduced to 4s. per 1000 feet, was proposed, but lost by a large majority, and the proceedings were confirmed.

SHOREHAM WATER COMPANY.—An extraordinary general meeting of this Company was held on Tuesday, the 2nd inst.—Dr. Fuller in the chair. The Secretary (Mr. T. Hardy) read the report, which was as follows:—

Your Directors have to report that the Bill confirming the Provisional Order authorizing the Company to construct additional works, and extending the limits for the supply of water so as to include the parishes of Lancing, Upper Beeding, and Bramber, received the Royal Assent on the 21st of July last. The works authorized by the Order must (in pursuance of the Gas and Water Works Facilities Act, 1870) be substantially commenced within one year, and completed within three years of the passing of the Act confirming the Order. Your Directors have consulted an eminent Engineer (Mr. G. W. Stevenson) as to the works necessary to be done, so as to secure an efficient supply of water to such portions of the district as it is intended immediately to occupy, and especially as to the sizes of the mains, the capacity of the reservoir, and the pumping power to be employed. The works which Mr. Stevenson recommends, or that portion of them which your Directors think it expedient immediately to execute, are:—A reservoir to contain 100,000 gallons at Portslade; an 8-inch independent main, from the pumping-station, along the upper road, to the intended new reservoir; about 600 yards of 4-inch distributing mains, in Portslade village; and new and improved pumping machinery, of greater power than that at present in use. With regard to the new machinery, your Directors are advised, and believe that the saving in fuel by the use of such improved plant will more than pay the interest on the outlay. The estimated cost of the works mentioned, and of the Order under which they are to be executed, is £6000, and your Directors recommend that £10 preference shares of that amount, bearing dividend up to 5 per cent. per annum, be offered to the Shareholders in the proportions which their present holdings respectively bear to the capital of the Company. Your Directors believe that the estimated outlay will, by the rates to be obtained from Portslade village, and the saving of fuel by the use of the new machinery, in a very short time be productive of at least 5 per cent. No outlay in respect of Lancing, Upper Beeding, or Bramber, will be made unless rates of a sufficient amount are guaranteed by the owners or occupiers of property in the respective parishes. Your Directors, therefore, hope that the increase of capital will not have the effect of reducing, even temporarily, the dividends on the present shares to less than 5 per cent., whilst the works intended to be carried out will be available for the supply of the Aldrington Estate, will make the undertaking a more substantial one, and must eventually lead to a large increase of profitable business.

The Chairman, in moving the adoption of the report, said that the present income of the Company, if it was not increased at all, would pay 5 per cent. on the preference stock, and nearly 5 per cent. on the original stock. Therefore, he thought the existing Shareholders would not be injured, to a great extent, by the proposed issue of new shares, and eventually would be very much benefited. Mr. W. D. Savage seconded the motion, which was carried. Mr. Brown moved a resolution to the effect that the Directors should be authorized to issue 600 preferential shares of the nominal value of £10 each, with a dividend of 5 per cent. per annum. Mr. Blaker seconded the motion, which was also carried; and a vote of thanks to the Chairman for presiding terminated the meeting.

THE LIVERPOOL CORPORATION (VYRNWY) WATER SCHEME.—At the meeting of the Bridgnorth Town Council on Thursday, the 4th inst., the proposal of the Liverpool Corporation to obtain a supply of water from the Vyrnwy was discussed, a letter being read from the Town Clerk of Worcester enclosing a copy of the resolutions passed by the Worcester Town Council, and which have already been published. Alderman Edkins said he thought this was one of the most important questions that had ever come before the Council. If the river were further reduced in height in a dry summer there would be great difficulty in supplying the town with water. Mr. Deighton agreed in the importance of the subject, but objected to enter

into a contract to join in expensive law proceedings until they had further information supplied to them. He proposed a resolution to the effect that a reply to the communication be sent, stating that the Council would, by a resolution and influence with members of Parliament, support the opposition to the Liverpool scheme, but that they did not feel justified in binding themselves to support any law-suit until further information had been obtained. Alderman Whatmore seconded the motion, and it was carried.—At the monthly meeting of the Shrewsbury Town Council the following Monday, the same resolutions were under discussion, and Mr. Southam said the more he looked into the scheme the less he liked it, and the more satisfied he was that it would be prejudicial to the welfare of the borough. He was present when the deputation attended from Liverpool, and was much surprised at the crude explanations which were given, and the unsatisfactory state of matters generally. It was said that Liverpool would not take water until the compensation water was put into the river in dry weather, but it seemed so incredible to him that a town like Liverpool should be kept without water that he could not believe that this would ever be done. He believed if the scheme were carried out it would result in Shrewsbury having continually to fight Liverpool as to whether the proper supply of compensation water was allowed or not, and as Liverpool was so much richer than Shrewsbury, the latter would sure to be the loser. He moved, "That in the opinion of the Council the scheme for supplying Liverpool and other large areas of population with water from the sources of the Severn would be prejudicial to the health and the general interests of the borough, and that a Committee be appointed to act with the Worcester Corporation and other parties, in order to organize united and vigorous opposition to the scheme; that a copy of this resolution be sent to the different Corporations and parties interested in the question." Mr. Loxdale seconded this. Mr. Fletcher moved, as an amendment, "That the Gas, Water, and Lighting Committee, with the Town Clerk, be instructed to watch the scheme, and see that the proper compensation clauses are inserted." Mr. Turner and Mr. Thompson thought they were not in a position at that time to pass any resolution, and after some further discussion the motion and amendment were both withdrawn, and it was agreed that the subject be considered at the next monthly meeting.

THE USE OF PARAFFIN OIL FOR STREET LIGHTING.—At the meeting of the Halsted (Essex) Board of Health last week, the Clerk (Mr. R. Morton) stated that he had written to Mr. Greenwood, the owner of the gas-works, as instructed by the Board, to the effect that unless a satisfactory reduction was made in the price of gas, the Board would substitute some other method of lighting the town. A day or two after he (the Clerk) received a letter from him, agreeing to a reduction of 5d. per 1000 cubic feet, both as regards the town lamps and to private consumers, the reduction to date from Michaelmas as far as private consumers were concerned, and with regard to the public lighting from the present time. The Surveyor, who was instructed to visit Romford and Barking with the view of gaining information as to the use of oil for public lighting, then presented the following report:—

Halsted, Aug. 27, 1879.

Gentlemen,—In accordance with your directions I have visited Romford and Barking with a view of getting information as to lighting by paraffin.

At Romford I gained the following information:—In consequence of the high price of gas, the Board determined to light the town with paraffin. The experiment was carried out for two successive seasons, but through public dissatisfaction on the one hand, and a reduction in the price of gas on the other, the Board purpose returning to the original gas-lamps for the coming season. There are 116 lamps in Romford. Seven of these are night lights, used all the year round, the remainder are only lit from the 1st of September to the 30th of April. The Gas Company contract with the Board at per lamp. This was £3 8s. before the use of oil, but reduced to £2 19s. for the coming winter. Last year the lighting cost £211 2s., which would show a considerable advantage in a pecuniary point. This, however, appears to be counterbalanced by inferior light and broken chimneys, one stormy night as many as 60 of the latter being damaged. The public generally approve of the return to gas.

At Barking the lighting by paraffin is undoubtedly a great success. The lamps, 90 in number, are lit every night all the year round. Labour in lighting costs £1 19s. per week; oil, contracted for, 7¾d. per gallon for the coming season; quantity used, about two barrels per week. The lamps hold about one quart of oil and are allowed to burn out. The lanterns and lamps complete cost £101 16s. The town has been lit by paraffin for the past four years, the plan giving general satisfaction, especially in a pecuniary point. The lighting rate four years ago was 9d. and 10d. in the pound, and there was a deficit to the amount of £100. From that time the plant has been purchased, the rate reduced to 6d., and there is a balance in hand of £110.

(Signed) G. H. MATHEWS, Surveyor.

In the discussion which ensued, it was stated that the population of Barking is 5000, so that the system was quite applicable to Halsted. It was, however, resolved that Mr. Greenwood's offer of a reduction of 5d. per 1000 feet in the price of gas be accepted, on the condition that the gas supplied be of an illuminating power of not less than 12 candles. Mr. Greenwood has already intimated that he has no objection to guarantee to provide gas of 12-candle power.

Register of Patents.

4667.—PROUD, T., Birmingham, "*Improvements in flexible valves for preventing the escape of gas when laying, repairing, or connecting gas-mains.*" Provisional protection only obtained. Dated Dec. 8, 1877.

This invention has for its object the construction of valves in such a manner as to render them suitable and of easy application to prevent loss of gas by escape, and the consequent chances of danger when laying, repairing, altering, or connecting gas-mains.

The invention consists of a tubular rod, to one end of which is fixed a disc of sheet rubber, or other flexible material but little affected by gas. The edge of this disc is fixed to an india-rubber band, which receives the ends of a number of stays that radiate from, and are hinged to a sleeve which is free to slide along the rod. The rod has a rack which is operated upon by a pinion attached to a spindle furnished with a handle.

The action and use of the apparatus are as follows:—Supposing it is desired to stop the flow of gas at any particular part of the main, a suitable hole is drilled therein, and the valve inserted through it. By thrusting the rod forward, and then drawing it back again, the valve is caused to distend, when a jointed stay or support is placed beneath the rack end of the rod, and the hole closed by a flexible disc or cup and cross-bar and screw. The handle is then turned so as to actuate the rod, and cause the radiating arms to distend the band and disc until they press against the interior of the main, and completely close the passage, thus preventing any escape of gas.

When it is desired to open the communication again, the reversal of the action before described is all that is necessary, when the valve and its support may be withdrawn, and the hole plugged.

4825.—LONGSHAW, J., Warrington, "*An improved gas-tap.*" Patent dated Dec. 19, 1877.

The object of this invention is to construct a tap for gas or other fluids at low pressure, which will not allow of the possibility of the escape of gas, and will not be liable to set fast.

The principle of construction of this improved tap is to separate the inlet and the outlet passages by means of a descending partition division-plate (by preference vertical), and then to open or close the communication between the two by lowering or raising the level of a small quantity of mercury contained in the lower part of a cup or vessel placed immediately below the two openings.

It will be evident that as the level of the mercury is lowered, and falls below the bottom of the partition or division-plate, communication will be made between the inlet and the outlet passages, and the gas will be permitted to flow; and, on the contrary, as soon as the level of the mercury is raised, the lower end of the partition or division-plate dips into the same, and communication between the inlet and outlet is shut off.

4919.—WILSON, J. G., Manchester, "*Improvements in and apparatus for carburetting gas to increase its illuminating properties.*" A communication. Patent dated Dec. 28, 1877.

The object of this invention is to so carburate coal gas as that its illuminating power shall be constant and equal in intensity, and this with a cheaper carburetting agent than has hitherto been practicable. The invention consists in a novel adaptation to the purpose of the principle involved in the ordinary bird-fountain, wherein of necessity a bubble of air must enter the supply in order to exhaust a like quantity of liquid.

In carrying out the invention, a chamber is employed of any convenient form, divided into an upper and a lower compartment. These compartments are in communication through suitable pipes and openings, and the upper compartment is designed to act as a reservoir, and to contain ordinary naphtha, which is the carburetting agent that it is preferred to employ on account of its cheapness, but purer and more expensive hydrocarbons may be employed.

The upper compartment is in communication with the lower compartment, and supplies the same with the required quantity of naphtha, on the principle of the bird-fountain, by means of a pipe, the lower extremity of which is kept sealed or closed by being arranged to dip into the naphtha lying at the bottom of such lower compartment. This lower compartment is further provided with a cylindrical partition of wire gauze, which supports a cotton or other fibrous web or covering extending from the bottom to the top of the compartment, and which is thus kept constantly saturated with the naphtha by capillary attraction.

The gas to be carburetted is led by means of an inlet-pipe into the interior of the cylindrical partition, and thence escapes through the fibrous material to an outlet-pipe leading to the burners. On its way, however, the gas has necessarily absorbed a small quantity of the naphtha, and this has again been reinstated through the sealed pipe before mentioned allowing a bubble of gas to enter the upper compartment, and thus to displace a like quantity of the naphtha which has trickled down into the lower compartment. A fresh quantity of the carburetting agent is thus constantly being introduced into the carburetting chamber, and thereby the gas is carburetted so as to give a constant illuminating power without any residuum being left, and this with a cheaper agent than has hitherto been practicable.

4928.—KIRKHAM, T. N., Abingdon Street, Westminster, HULETT, D., High Holborn, and CHANDLER, S. and S. jun., Newington Causeway, "*Improvements in apparatus for condensing, washing, and purifying gas and other vapours.*" Patent dated Dec. 29, 1877.

This invention relates more particularly to condensing, washing, and absorbing impurities from coal gas, but is equally applicable to the treatment of other gases and vapours, such, for example, as the condensing and absorbing of ammonia, sulphurous acid gas, and hydrochloric acid gas, and has reference to certain improvements in or upon apparatus for which letters patent were granted to inventors, dated May 10, 1877 (No. 1814).

The present invention consists of a simple and compact arrangement of apparatus containing a number of annular plates (or perforated discs of any desired shape) of metal or other suitable material, arranged in two or more clusters upon one and the same shaft (instead of employing clusters of solid discs mounted upon separate shafts, as described and illustrated in the specification to the letters patent before referred to), and caused to rotate in water or other suitable liquid, or solutions, for the purpose of maintaining them in a wet condition.

The gases or other vapours to be treated in their passage through the apparatus are caused to travel over and impinge against the surfaces of these annular plates or perforated discs, whereby the condensation and absorption or purification of the gases or vapours is more rapidly effected in a minimum amount of space than heretofore.

[The invention is not further described apart from the drawings.]

4937.—SIMON, H., Manchester, "*Improvements in gas motor engines.*" A communication. Provisional protection only obtained. Dated Dec. 31, 1877.

According to the present invention a cylinder, open at both ends, contains two pistons, the rods of which extend in opposite directions, and have cross-heads working in guides and connected to the ends of sway-beams carried by the framing, the other ends of which beams are connected by rods to opposite cranks on the engine-shaft. The pistons are so arranged that at the end of their in-strokes they meet at the middle of the cylinder, which has at this point ports governed by a rotary slide, having suitable passages and connections to a gas and air supply, whereby a combustible charge of gas and air is first admitted between the pistons, then ignited by a gas-flame, and, after the combustion has taken place, the gaseous products are allowed to escape. The rotary slide receives a continuous rotary motion by means of bevel gear and a counter-shaft from the engine-shaft.

In operating with this engine, the engine-shaft is first turned so as to cause the two pistons to move somewhat away from each other, whereby the combustible charge is drawn in between them. On the ignition of the charge the two pistons are propelled in opposite directions, thereby imparting motion simultaneously through the sway-beams, connecting-rods, and opposite cranks, to the crank-shaft. The return stroke of the pistons is effected by the atmospheric pressure acting against the partial vacuum formed between the pistons by the expansion and cooling of the products of combustion.

By the above means the whole of the motive power produced by the combustion of the gases is transmitted to the engine-shaft.

101.—PENNEY, J., Stockport, "*Improvements in ferrule taps, and in the method of connecting the same to steam, gas, and water pipes, and in apparatus employed in effecting the connection.*" Patent dated Jan. 8, 1878.

This invention relates principally to the connecting of branch or service-pipes with gas and water mains during times when there is a pressure of gas or water within such mains, but is also applicable with advantage to some cases where steam connections have to be effected under pressure.

A chamber is employed to contain the tap, which the patentee terms a cock, to avoid confusion, and the drilling and tapping tool or tools and the cock are brought into the required position by revolving the chamber, which is formed and fitted to revolve in a sufficiently gas, water, or steam tight manner, and is provided with glands through which the shafts or handles of the tools and cock-holder project.

The cock may be of an ordinary description, but it is preferred to provide it with a projection which enters a slot in the cock-holder, whereby the cock is sustained, and the holder is enabled to turn the cock in the screwing operation, or the cock and holder may be otherwise formed to engage the one with the other. A changable saddle-piece is formed to fit the pipe, main, or part which is to be tapped. This is clamped to the main by means of chains, tightened by a screw or screws, or other suitable means. To this saddle there is bolted or secured a base, which is turned to receive the chamber, caoutchouc washers or other packing being employed to secure the joints between the main and the saddle, and between the saddle and the base.

A tight joint between the base and the chamber is obtained by turning and grinding the two to fit with sufficient tightness, the two parts being held together by means of a ring and bolts or screws; or the joints may be arranged to be packed as in the case of a stuffing-box. The packed glands, through which the cock and tool holders pass, are each out of the centre, and at an equal distance therefrom.

If the drill and the tapping tool be formed as one tool only, two glands will be required, and these may be in a line on opposite sides of the centre of rotation of the chamber, so that by turning the chamber half round after the hole has been drilled and tapped, the cock is brought over the hole, and may then be screwed into it by turning the cock-holder. The drill and the tap may be formed as separate tools, each having a holder or shaft passing through a separate gland; and as many tools as may be required may thus be arranged.

The cock may be formed with a taper screwed end, and the tapping tool be formed to a similar taper, so that a tight joint is effected; but this may be varied as considered to be most suitable.

103.—Sugg, W. T., Westminster, "*Improved apparatus for purifying illuminating gas.*" Patent dated Jan. 8, 1878.

The object of this invention is to provide facile means for carrying out the purifying process for which a patent was granted to the present inventor, in conjunction with Frederick John Evans, bearing date Sept. 12, 1877 (No. 3445). The process consists in submitting the gas as it leaves the retort to ammonia, either in the gaseous or liquid form, to neutralize the acid impurities in the gas. These acids require the presence of water for their absorption, and it has been found that the water requires constant renewal to secure this result. To this end an apparatus is constructed for receiving the gas, and presenting to it a continuous stream of water or ammoniacal liquor, which, as it becomes charged with the impurities of the gas, will flow off, together with the deposited tar, into suitable receptacles.

The apparatus is by preference made in three divisions, that which receives the liquor being at the highest, and that which is in connection with the gas supply-pipe at the lowest. This pipe leads the gas up to the top of the compartment, whence it descends by a dip-pipe, and bubbles through the liquor or liquid which seals the pipe, depositing the greater part of the tar which comes over with it, and leaving absorbed in the liquor the greater portion of the gaseous impurities. The gas is then guided upwards by a pendent partition plate to a passage communicating with a dip-pipe in the second compartment. From the bottom of this pendent pipe the gas escapes, bubbling through the liquor as before, and leaving therein a further portion of its impurities. The gas then passes in like manner into the third compartment, where it deposits the remainder of its impurities in the liquor, which meets it fresh from the supply-pipe. The purified gas is led off from this third compartment to the gasholder, it being, if required, first cooled by being passed through a scrubber, and otherwise treated to separate the ammonia therefrom.

From the floor of the first or highest compartment, and also the second, rise partitions, which serve to gauge the height of the liquor therein, and regulate its downward flow, the liquor being always subject to the pressure of the gas. Each compartment is provided with a discharge-pipe for removing the tar deposited therein, and for running it into suitable receptacles.

The tar as it is deposited in the lowest compartment is run off continuously with the foul liquor, by means of a pipe; suitable means are, however, provided for maintaining in that compartment the requisite level of liquor for sealing the dip-pipe.

The compartment which first receives the gas may extend from end to end of the bed of retorts; in other words, the hydraulic main may form the lowest of the series of purifying compartments; or, if desired, the retorts may discharge into a main-pipe, and the lowest compartment of the series may be connected with the end of that main-pipe. The first arrangement is, however, preferred where the gas-works will admit of its adoption.

By drawing off the tar at two or more stages of the purifying operation, tars of different qualities, and suitable for different uses, may be obtained.

[The invention is not further described apart from the drawings accompanying the specification.]

161.—Jordan, C., Newport, Mon., "*Improvements in joints for connecting pipes or tubes for gas, water, or other purposes.*" Patent dated Jan. 12, 1878.

This invention relates to improvements in the method of making joints for connecting pipes or tubes for gas, water, or other purposes.

When molten lead is used for filling the space in the socket around the end of the pipe it is connected to, when the lead is cold and set the shrinking of the metal causes a space to be left between it and the surfaces of the pipes, an imperfect joint being the result, which it is difficult afterwards to close and make perfectly tight.

According to this invention, the filling piece of lead or its alloys or other comparatively soft metal is cast, in the form of a bush or ring, in cast iron, wrought iron, steel, or other "chill" moulds. This bush or ring is then inserted in the socket, or placed on the end of the pipe or tube to form the joint, and the two parts being made to fit tightly, are then forced or drawn together so as to compress the bush or ring of lead or soft metal between or around the two ends of the pipes or tubes, and thus form a perfectly tight joint.

In the case of small pipes or tubes, they may be forced together by means of a sledge hammer, or otherwise, and for larger pipes they may be formed with lugs on the socket, a wrought-iron or metal gland being placed across the socket of the pipe to be connected, which is forced into place by means of screw-bolts connected to the lugs and to the gland, or otherwise.

The bush or ring may be formed with an inclined passage through it, so as to admit of the pipes being set or jointed at an angle to each other.

216.—Wright, F., Westminster, "*An improved governor for gas-burners.*" Patent dated Jan. 17, 1878.

This invention relates to a governor for gas-burners, whereby the quantity of gas issuing from the burner is regulated so as to be nearly uniform, notwithstanding variations in the pressure of the supply. For this purpose a small cylinder is provided, in which are placed two discs, connected together at some distance apart by a stem. The upper part of the stem terminates in a cone or valve, which faces an aperture leading from the top of the cylinder to the burner. The cylinder is closed at bottom, but has lateral orifices communicating with the gas supply-pipe, and opening into the cylinder in the space between the two discs. The communication from the supply-pipe to these orifices is conveniently effected by means of an annular space formed around the cylinder by an outer casing.

The discs fit the cylinder loosely, so that gas can leak past their edges, and thus gas entering the cylinder by its lateral orifices leaks past the upper disc to supply the burner. Should the pressure in the gas-main increase, the flow through the cylinder to the burner lifts the discs and stem, and so causes the cone or valve of the stem to close, more or less, the aperture above it, whereby the supply to the burner is more or less throttled. The lower disc acts as a pneumatic buffer or damper, preventing sudden oscillations.

The weight of the discs and their stem is made somewhat greater than the greatest pressure that is likely to act upon the cone or valve to close the orifice to the burner, and the cylinder is preferably slightly tapered to a larger size at the upper part, so that when the cone or valve almost closes the aperture there is more area for the flow of gas past the edge of the upper disc.

230.—Wallace, R. W., London, and Christopher, G., Clapham, "*Improvements in the purification of gas, and the production of bye-products therefrom.*" Provisional protection only obtained. Dated Jan. 17, 1878.

This invention relates to the purification of coal and other gases from sulphuretted hydrogen, and the production therefrom, in an available form, of the sulphur contained therein; also the production of other valuable bye-products.

In carrying the invention into practice with respect to coal gas, the gas is first freed from ammonia as completely as possible by any convenient process, in order that a metallic sulphide may not be precipitated in the process hereafter described. The gas is then passed through a series of washers or scrubbers containing a solution of sesqui-chloride of iron (commonly termed perchloride of iron) or any other metallic solution on which sulphuretted hydrogen would have a similar effect in converting a sesqui-salt into a proto-salt with precipitation of sulphur; such, for instance, as sesqui-sulphate of iron. It is necessary that the solution be sufficiently acid to prevent the precipitation of a metallic sulphide. As this solution is corrosive, it is desirable to construct the washer or scrubber only of materials that will resist the action of the acid; such, for instance, as lead, earthenware, stoneware, or wood; or, if corrodible materials are used, it is proposed to coat them with some acid-resisting film.

In employing a solution of perchloride of iron, when, through the action of the sulphuretted hydrogen in the gas, only a small quantity of the iron remains in the state of perchloride, the remainder having been converted into proto-chloride of iron, and the corresponding quantity of sulphur precipitated, the solution is passed through any convenient filter, and the sulphur thus filtered off is washed and utilized. The solution is then revivified by exposing it to the action of air, either in a scrubber or washer through which air is passed, or by exposure to air in shallow pans or other vessels. This process is repeated indefinitely, a small quantity of acid being added from time to time, as may be found necessary, owing to the possible gradual neutralization of the acid originally present by the admission of small quantities of ammonia with the gas.

In order to prevent the scrubbers or washers from becoming blocked up with sulphur, the solution may be filtered from time to time, if found desirable, before it becomes exhausted. A solution of a salt of chromic acid may also be employed, such as chromate or bichromate of potash, acidulated sufficiently by some acid which forms a soluble sesqui-salt of chromium. In this latter method the chromic acid becomes reduced by the action of the sulphuretted hydrogen to chromic oxide, which forms a sesqui-salt of chromium with the acid present whilst sulphur is precipitated. This sulphur is treated as already described.

The solution of sesqui-chloride of chromium formed is employed for the preparation of various other compounds of chromium.

The patentees do not confine themselves to the purification of coal gas by the above described processes, but also apply their invention to the purification of other gases containing sulphuretted hydrogen, and to the utilization of the sulphur present, such as the mixture of gases given off from the saturator in the manufacture of sulphate of ammonia. The carbonic acid present is afterwards utilized for the production of carbonates of soda, potash, or ammonia by any convenient process.

233.—Thomas, H., Oldham, "*Improvements in gas-meters.*" Patent dated Jan. 18, 1878.

The object of this invention is to secure the more correct measurement of gas, by causing the whole surface of the water or other liquid in the meter to remain as nearly as possible at the same level under varying conditions of pressure and rates of discharge of the gas; to maintain the same correct level, by instant compensation for any loss of water by evaporation or otherwise; and to provide means whereby the extraction of unregistered gas is prevented.

These improvements consist in so forming the partition which divides the front or float chamber from the chamber in which the measuring drum revolves, that the inlet gas has access to both; and the placing of a screen or mid-feather in such a position as to direct the gas to flow through an opening in the partition into the drum chamber, and towards the openings in the measuring drum. The measuring drum is retained in the position ordinarily adopted, but its action is reversed, and a bent tube may be attached to the spout, by means of which the gas, after entering at the back hoods and passing through the drum, is conveyed to the outlet, or the gas may pass from the spout or spouts into the upper part of the waste water box, and from thence through a channel or conduit to the outlet. This arrangement is applied in combination with a compensating float of a semi-circular form (to which is attached a valve) with its axis fixed in such a position that the descent of the float instantly restores the water level, and thus compensates for any loss of water.

In addition to the foregoing, the water-line pipe is placed in the front box, and as the bottom end of it is carried down into the waste water box and sealed therein, the possibility of drawing off unregistered gas through the waste water outlet is completely prevented.

244.—Livesey, J., Westminster, and Kidd, J., Wandsworth, "*Improvements in the production of combustible gas, and in the enrichment thereof for illuminating purposes, and apparatus therefor.*" Patent dated Jan. 18, 1878.

This invention relates to the production of combustible gas applicable for heating or illuminating purposes, and to the enrichment, by means of solid naphthaline, of the gas, or of such gases as are imperfectly luminous and to apparatus employed for these purposes.

For the production of combustible gas, apparatus of the following description is employed:—A furnace or stove, preferably of cylindrical form, is surrounded or partly surrounded by a water casing, forming a boiler, in which steam is generated. Within the stove is a coiled pipe, through which the steam passes, becoming superheated. There is also in the stove, and exposed to the direct action of the fire, a retort or metallic vessel charged with coke, anthracite, or similar carbonaceous matter. The superheated steam from the coil is caused to pass through the heated material in this retort, and combustible gas, or a mixture of combustible gases, is thereby produced,

which is conducted, by a pipe from the retort, to be used for any required heating or illuminating purpose.

The stove or furnace, instead of being open, may be constructed and worked as a gas producer in any known manner, and the gas produced from it may, if desired, be mixed with that generated in the retort. As the gas thus produced is deficient in illuminating power, the patentees enrich it, when it is to be used for illumination, by admixture of the vapours of light hydrocarbon oils in any known manner. They prefer, however, to use for the purpose of enrichment the solid hydrocarbon naphthaline, which is generally treated as a waste product, and they apply it in the following manner:—They heat or sublime the naphthaline so as to clear it of water and other impurities, and then place the purified naphthaline in a vessel through which the combustible gas is passed on its way to the burner. Heat is employed in order to vaporize the naphthaline. This is effected in a convenient manner by employing the flame of the burner; or the required heat is obtained from an independent source, in such a manner as to fuse and vaporize the naphthaline. The vapour of the naphthaline mingling with the gas gives it illuminating power.

For convenience of applying naphthaline in this manner, it is prepared in the first place by fusion, in the form of sticks, rods, or pellets, which can be readily introduced into the vessel, which is termed the carburetting vessel, through a hole provided with a cap or plug.

Naphthaline may be applied, as described above, for the purpose of enriching ordinary coal gas or other combustible gases.

APPLICATIONS FOR LETTERS PATENT.

3604.—Thompson, W. P., Liverpool, "Improvements in and appertaining to apparatus for heating by means of gas or hydrocarbon flames." A communication. Sept. 8, 1879.

3613.—Trewby, G. C., and Fenner, H. W., Beckton, Essex, "Improvements in the distillation of coal tar." Sept. 9, 1879.

3636.—Liggat, A., Barrhead, N.B., "Improvements in apparatus connected with baths, lavatories, and the like, for the purpose of preventing the waste of water therein." Sept. 11, 1879.

PATENTS WHICH HAVE PASSED THE GREAT SEAL.

966.—Caw, C. W., Ivy Bridge, Devon, "Improvements in taps and valves." March 11, 1879.

989.—Cobt, J., "Lower Bland Street, London, "Improvements in apparatus used in the manufacture of gas." March 13, 1879.

1006.—Meuter, E. de, jun., St. Gelles, Belgium, "Improvements in the construction of burners for lamps, and in apparatus to be used in connection therewith." March 14, 1879.

1097.—Harrison, F. J., Notting Hill, London, "Improved attachments to fishtail and other gas burners for expanding and improving the light." March 19, 1879.

1160.—Wigham, J. R., Monkstown, Dublin, "Improvements in illuminating lighthouses and other places." March 24, 1879.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

3376.—Sieh, P., and Schwarz, T., "Improvements in gas regulating and saving apparatus." Aug. 28, 1876.

3485.—Clark, A. M., "Improvements in the purification of gas." Sept. 4, 1876.

3510.—Anderson, R. C., "Improvements in valves." Sept. 6, 1876.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

2262.—Crampton, T. R., "Improvements in the manufacture of gas and fuel, and in apparatus to be used for this purpose." July 29, 1872.

2296.—Haseltine, G., "Improvements in machines for the manufacture of gas." Aug. 1, 1872.

2416.—Chandler, S., sen., S., jun., and J., "Improvements in dip-pipes for regulating the seal in hydraulic mains used in the manufacture of gas." Aug. 14, 1872.

2487.—Young, W., Scott, A., and Stephens, W. W., "Improvements in the destructive distillation of coal, shale, and other bituminous substances for the production of illuminating gas and of oils." Aug. 21, 1872.

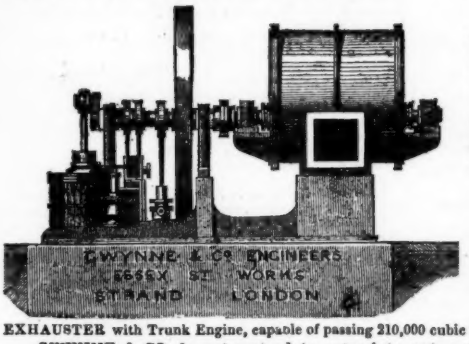
2528.—Parker, J. F., and Wade, A., "Improvements in the manufacture from coal and petroleum of hydrocarbon gas or gas for illuminating and heating." Aug. 26, 1872.

2576.—Spencer, G., "Improvements in the purification of coal gas used for illuminating purposes, and for mechanical purposes, and in apparatus therefor." Aug. 30, 1872.

2643.—Shanks, J., "Improvements in water-closets, and in taps or valves for the same, and for water supply-pipes." Sept. 5, 1872.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION, TWO MEDALS at the PHILADELPHIA EXHIBITION and TWO MEDALS at the PARIS EXHIBITION, have been AWARDED to GWYNNE & CO. for GAS-EXHAUSTERS, ENGINES, and PUMPS; Also 27 OTHER MEDALS AWARDED at all the GREAT INTERNATIONAL EXHIBITIONS.

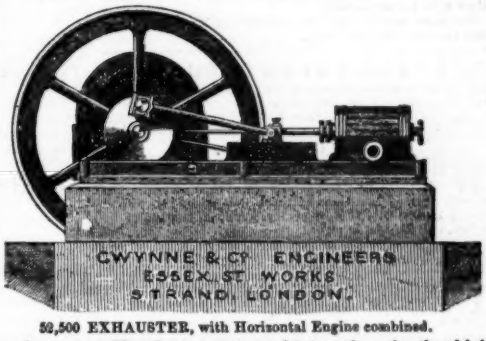
GWYNNE & BEALE'S PATENT GAS-EXHAUSTERS & ENGINES.



EXHAUSTER with Trunk Engine, capable of passing 210,000 cubic feet per hour.

The Judges report on the combined Exhauster and Steam-Engine exhibited at the Philadelphia Exhibition is—"*Reliable compact Machine, well adapted for the purpose intended, of excellent workmanship.*"

GWYNNE & CO. have made the largest and most perfect Gas-Exhausting Machinery in the world, and have completed Exhausters to the extent of 8,000,000 cubic feet passed per hour, of all sizes from 2000 to 210,000 cubic feet per hour.



52,500 EXHAUSTER, with Horizontal Engine combined.

GWYNNE & CO. do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, *but to produce machinery of the very highest quality, and most approved design and workmanship.* The result is that in every instance their work is giving the fullest satisfaction. Numerous testimonials and references can be given to Companies using their Machinery for years past.

Exhausters, with or without Engines combined, can be made to pass the gas WITHOUT OSCILLATION OR VARIATION IN PRESSURE Regulators, Bye-Passes, Stop-Valves, Gas-Valves, Station Governors, and Gas Machinery of all Sizes.

PLEASE ADDRESS IN FULL, GWYNNE & CO., Hydraulic and Gas Engineers, ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C., ENGLAND.

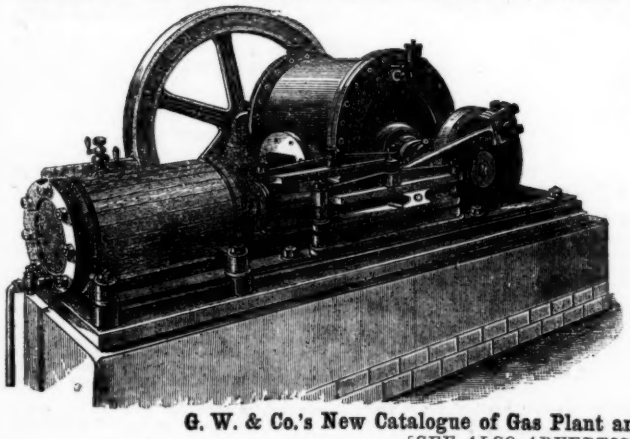
Gwynne & Co.'s New Catalogue on Gas-Exhausting and other Machinery may be obtained on application at the above Address.

BEALE'S IMPROVED PATENT GAS EXHAUSTERS,

WITH

Wrought-Iron Spindles and

ENGINES COMBINED.



SOLE MAKERS,

GEORGE WALLER & CO.

MAKERS OF ENGINES, EXHAUSTERS, INDEX AND DISC GAS-VALVES, HYDRAULIC MAIN VALVES, BYE-PASS VALVES, TAR, LIQUOR, AND OTHER PUMPS, SCRUBBERS AND PURIFIERS, CONDENSERS, BOILERS, &c.

G. W. & Co.'s New Catalogue of Gas Plant and Machinery can be had on application.

[*SEE ALSO ADVERTISEMENT, PAGE* 454.]

Phœnix Engineering Works:

HOLLAND STREET, SOUTHWARK, S.E.

WANTED, Readers of the NEW Edition, 1879, "Cooking & Heating by Gas;" on Burners, &c. Copies, by post, Threepence, direct from the Author, MAGNUS OHREN, Assoc.M.I.C.E., Gas-Works, SYDENHAM.

TO GAS MANAGERS.

WANTED, by a respectable Young Man, aged 20, Employment in the Gas-Fitting trade as Improver. Is a fair hand at Fittings and Fixing Meters. Wages not an object where good practice of fitting could be gained.

Address No. 583, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Re-engagement as MANAGER of a medium-sized Gas-Works, or ASSISTANT in a large works. Over 20 years experience in all branches. Has charge of Gas-Works making over 100 millions annually. Would consent to be paid by results. References, testimonials, &c., from previous employers.

Address No. 581, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO TAR DISTILLERS AND GAS COMPANIES.

A Practical Man of considerable expe- rience will shortly be at liberty to take the Management, or as Sub-Manager, of Tar Distilling and its Products, and the Erection of all Plant.

Address No. 582, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS MANAGER WANTED.

THE Directors of the Portrush Gas Com- pany, Limited, require a Steady WORKING MANAGER, who thoroughly understands the Manufacture and Distribution of Gas, Main and Service Laying, Setting of Retorts, and Gas-Fitting. About 200 tons of coal carbonized yearly. He will require to enter upon his duties on the 4th of October next. He will have a house, coal, gas, and garden free.

Applicants to forward recent testimonials, and state salary expected, if married and what family, to JOHN BAMFORD, Secretary, PORTRUSH, on or before the 25th of September.

Portrush, Sept. 12, 1879.

IMPROVED PHOTOMETER DISCS.

PRICE for a single Disc, sent free by post, 1s. 7d. Price per dozen, 12s. 6d.

Apply to J. WILKINSON, Gas Engineer, &c., Grimesthorpe, SHEFFIELD.

EXHAUSTER—Beale's 30,000 feet per hour; Makers, Burton and Waller; fit for immediate use—for sale cheap.

For price and particulars apply to the MANAGER, Brentford Gas-Works, SOUTHALL.

STATION-METER for Sale, to pass 10,000 cubic feet per hour (maker, Milne), with Valves and 9 in. Connections, complete.

Apply to the MANAGER, Gas-Works, Lea Bridge, LONDON.

DRY GAS-METERS.

WE have a large extra Stock of these, in three, five, and ten lights, of the best make, that we can offer at less than half the list price. Have been tested by the City Gas Inspector. Also a few 100 to 300 lights, equally low in price.

HODGE AND CO., Gas Engineers, 100 and 101, Hatton Garden, LONDON, E.C.

TO BE SOLD, Cheap, Three Telescopic GASHOLDERS, two 60 ft. diameter and 20 ft. deep each lift, and one 70 ft. in diameter and 20 ft. deep. Only been in use eight years. May now be seen at work at the Effingham Street Gas-Works, Sheffield.

For price, apply to THOMAS PIGGOTT AND CO., Spring Hill, BIRMINGHAM.

FOR SALE—Cast-Iron Socket Pipes and Connections for Gas or Water.

		cwt.	qr.	lbs.
75 Pipes, 14 in. by 9 ft., weighing each about		7	1	26
38 " 16 in. by 9 ft., " "		8	2	19

20 Bends, 14 in.; 20 Crosses, 14 in.; 10 Tees, 16 in.; 5 Bends, 16 in.; 5 Crosses, 16 in.

These pipes are new, and have been cast vertically at one of the best Glasgow foundries. They have been tested to a hydraulic pressure of 300 feet.

The above are offered for sale on account of smaller diameters being substituted for them. They will be sold cheap.

Apply to CASTEL AND LATTA, 3, Lombard Court, E.C.

COAL TAR.

TENDERS are invited for the Purchase of the Surplus TAR produced at the Aldershot Gas-Works during the year commencing the 1st of October next. Estimated quantity, about 25,000 gallons. The Tar will be delivered on rail at Aldershot or Tongham Station, in purchaser's casks.

Tenders to be delivered by the 23rd inst. to WILSON AND DOUGLAS, ALDERSHOT.

WALLASEY GAS-WORKS.

TO TAR DISTILLERS AND OTHERS.

THE Wallasey Local Board are prepared to receive TENDERS for the Purchase of the AMMONIACAL LIQUOR (about 120,000 gallons per annum), and also of the Surplus GAS TAR (from 50,000 to 60,000 gallons per annum), produced from time to time at their Gas-Works, Great Float, near Birkenhead, during a period of One, Two, or Three years, from the 30th of September inst.

Any further information may be obtained on application to Mr. E. H. Harris, Gas and Water Manager to the Board.

Sealed tenders, endorsed "Tar, &c.," and addressed to the Chairman of the Gas and Water Committee, to be left at my Office, Church Street, Egremont, Cheshire, before Five o'clock in the Afternoon of Wednesday, the 24th inst.

The Board do not bind themselves to accept the highest or any tender.

By order,
T. SOMERVILLE JONES, Clerk to the Board.
Public Offices, Egremont, Sept. 8, 1879.

PHŒNIX GASLIGHT AND COKE COMPANY.

NOTICE is hereby given that the ADJOURNED HALF-YEARLY GENERAL MEETING of the PROPRIETORS holding, previous to the 30th of June last, £300 and upwards of paid-up capital in the said Company, will be held, pursuant to the Act of Incorporation, on WEDNESDAY, the 1st of October, at Two o'clock precisely, at the Bridge House Hotel, in the Borough of Southwark, for the purpose of declaring Dividends to the 30th of June last, and on other business.

The Transfer Books will be closed from the 10th of September until the 1st of October, both days inclusive.

By order,
I. A. CROCKENDEN, Secretary.
70, Bankside, London, S.E., Sept. 6, 1879.

TOTTENHAM AND EDMONTON GAS- LIGHT and COKE COMPANY.

NOTICE is hereby given that the ANNUAL ORDINARY GENERAL MEETING of the PROPRIETORS in this Company will be held at the Works, Willoughby Lane, Tottenham, on SATURDAY, the 27th day of September inst., at Three o'clock in the afternoon precisely, to receive the Report of the Directors, the Statement of Accounts for the Half Year ended the 30th of June, 1879, to declare Dividends, and for the election of two Directors and an Auditor for the ensuing year (Messrs. William Black and John Liddle being the Directors, and Mr. Hugh Hercus, the Auditor, who retire by rotation, and are eligible for re-election); to consider notice of motion given at half-yearly meeting held on the 5th of April last, as follows:—"That at the next Annual General Meeting the salary of the Secretary be taken into consideration;" and for transacting such other business as the Act of Parliament directs.

The Transfer Books will be closed on Friday, the 12th inst., until after the Meeting.

The Dividends to be declared will be payable on and after Monday, the 29th inst.

By order,
JAMES RANDALL, Secretary.
Offices, Edmonton, Middlesex, Sept. 12, 1879.

GAS PLANT FOR SALE.

A 10-in. Vertical Pipe Condenser, having 20 Pipes, each 19 ft. high, on Cast-Iron Base Box.

A Scrubber, 16 ft. high 5½ ft. diameter, fitted with thin boards, Self-Acting Liquor Distributor, 10-in. inlet and outlet pipes.

Two Single-Flue Cornish Boilers (new in 1870), each 9½ ft. long, 3 ft. 9 in. diameter; Fire Tube of Low Moor Iron, complete with all Fittings.

All in good working order; removed to make room for larger plant.

For further particulars apply to THOS. TREWHITT, Gas-Works, WEST HARTLEPOOL.

May 8, 1879.

TO IRONFOUNDERS.

THE Tralee Town Commissioners invite TENDERS for supplying—

260 Yards of 2-in. Cast-Iron Pipes, Turned and Bored Joints.

1500 Yards of 3-in. Cast-Iron Pipes, Turned and Bored Joints.

Coated with Dr. Smith's patent preparation, and delivered free at the Tralee Canal Basin or at the railway station.

Sealed tenders, addressed to the Town Clerk, will be received not later than the 4th of October next.

JAMES COFFEY, Town Clerk.
Tralee, Sept. 13, 1879.

CAST-IRON PIPES.

THE Gas Committee of the Corporation of Warrington are prepared to receive TENDERS from parties willing to contract for a Supply of Cast-Iron PIPES from 6 inches to 20 inches in diameter.

The particulars and conditions may be obtained from the undersigned.

Sealed tenders, endorsed on the outside "Tender for Pipes," to be sent in on or before Thursday, the 2nd of October next.

The Committee do not bind themselves to accept the lowest or any tender.

JAMES PATERSON, Engineer.
Gas-Works, Warrington, Sept. 11, 1879.

Price 28s., handsomely bound in Morocco, cloth sides, gilt edged and lettered.

THE FIRST VOLUME
OF
KING'S TREATISE
On the Science and Practice of the Manufacture and Distribution of
COAL GAS.
Edited by THOS. NEWBIGGING, C.E., M.Inst.C.E., and W. T. FEWTRELL, F.C.S.

Orders received by
WALTER KING, 11, Bolt Court, Fleet Street, London, E.C.

Prices, half bound, cloth sides, 2 quires, 30s.; 3 quires, 36s.; other sizes and bindings to order.

THE
GAS COMPANIES
EXPENDITURE JOURNAL,
Being a Ruled Account-Book with Printed Headings, and Analyzing Guide for Keeping, upon the easiest and most correct method, the Expenditure of a Gas Company, in accordance with the provisions of the Gas-Works Clauses Act of 1871, and suitable for all Companies.

Specimen, with illustration and full particulars; 2s. 6d. returned on the purchase of a "Journal."

Published by SANDELL AND SON, Accountants, 2, Great George Street, WESTMINSTER, and W. KING, Office of the JOURNAL OF GAS LIGHTING, 11, Bolt Court, FLEET STREET, E.C.

COMMERCIAL GAS COMPANY.

NOTICE is hereby given that an ORDINARY MEETING of the Commercial Gas Company will be holden at the Cannon Street Hotel, in the City of London, on FRIDAY, the 3rd of October, 1879, at Twelve o'clock at noon, to receive the Report of the Directors, to declare a Dividend, and for other business.

The Books will be closed for the transfer of Stock from the 20th of September inst. to the 3rd of October next, both days inclusive.

By order of the Board,
EDWARD J. SOUTHWELL, Secretary.
Offices, Stepney, Sept. 5, 1879.

STOCK OF THE BRISTOL UNITED GASLIGHT COMPANY.

MESSRS. H. R. FARGUS and CO. will Sell by Auction, in pursuance and under the provisions of the Bristol United Gaslight Company's Act, 1873, at their Sale Room, 4, Clare Street, in the City of Bristol, on Friday, Sept. 19, 1879, at Two o'clock precisely, £30,000 Capital Stock, issued by them under the authority of the above-named Act. The stock will be sold in lots of £100 each.

For conditions of sale and any further particulars apply to the Auctioneers, Clare Street, Bristol; to the Secretary of the Company, Canon's Marsh, Bristol; or to Messrs. BRITTAN, LIVETT, BOX, AND CO., Solicitors, Albion Chambers, BRISTOL.

TO GASHOLDER MAKERS.

THE Directors of the Gloucester Gas Company invite TENDERS for a GASHOLDER, 140 ft. diameter and 35 ft. deep, to be erected at their new Works, Hempsted.

Drawings and specification can be seen, and forms of tender obtained, on application at their new Works, Hempsted, on and after the 15th inst.

Sealed tenders must be sent in to me, and marked "Tender for Gasholder," on or before the 30th inst.

The Directors do not bind themselves to accept the lowest or any tender.

R. MORLAND, Engineer and Manager.
Gas-Works, Gloucester, Sept. 6, 1879.

THE Gloucester Gas Company, ceasing to manufacture gas at their old works, will have the undermentioned APPARATUS for Sale about the beginning of August, viz.:—

110 Mouthpieces, D-shape, 13 in. by 22 in., with Wrought-Iron Lids, Cross-Bars, Stand, Bridge, and Dip Pipes. Also about 150 feet of D-shape Wrought-Iron Hydraulic Main, size 19 in. by 19 in. 28 Mouthpieces, D-shape, 16 in. by 20 in., with Wrought-Iron Lids, Cross-Bars, Stand, Bridge, and Dip Pipes. Also about 38 ft. of D-shaped Wrought-Iron Hydraulic Main, size 20 in. by 20 in. Annular Condenser, consisting of six Vertical Pipes, 24 in. diameter, 19 ft. high, with three 12 in. Slide-Valves and 12 in. Connections.

Scrubber (round), 5 ft. by 20 ft., with three 12-in. Slide-Valves, and 12 in. Connections.

Exhauster (Jones) to pass about 15,000 feet per hour.

Exhauster (Beales) to pass about 25,000 feet per hour.

Two Vertical Steam-Engines, each about 6-horse power, with Pulleys, and Shafting used for driving the above.

Boiler 14 ft. 6 in. by 3 ft. 6 in., with Centre Tube, and four Galloway Patent Tubes.

4-horse power Horizontal Steam-Engine.

Three 4-in. Pumps, with cranked Shafting and a pair Mitre Wheels.

Set of four Purifiers, 12 ft. by 12 ft. by 4 ft., with 12-in. Centre-Valve (Cockeys), and Connections and Lift complete.

Station-Meter by A. Wright and Co., London, with three 12-in. Slide-Valves, and 12-in. Bye-Pass and Connections, to pass about 25,000 feet per hour.

Gasholder, Double Lift, with Cast-Iron Tank, capacity 37,000 feet.

Gasholder, Double Lift, capacity 100,000 feet.

Gasholder, Double Lift, capacity 240,000 feet.

Two 12-in. Governors, by Wright, London, with 12-in Valves, Bye-Pass, and Connections.

Two 12-in. four-way faced Valves, by Cockey.

For further information, &c., apply to the undersigned.
R. MORLAND, Engineer.

PRICE'S PATENT COKE & COAL BARROW

effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, Gas-Works, Hampton Wick, MIDDLESEX.

Prices are Reduced.

CLOTH GAS-BAGS FOR MAINS,

As supplied to the Imperial, Chartered, and other London and Provincial Gas Companies. Bellows and Valves for inflating Well Dresses, Stokers Gloves, India-Rubber Suction and Delivery Hose, Gas-Tubing, Leather, India-Rubber, and Gutta-Percha Machine-Bands, Sheet and Washers, and Steam Joints.

T. BUGDEN, Manufacturer,
107, GOSWELL ROAD, LONDON, E.C.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

IN THE CHANCERY OF THE COUNTY PALATINE OF LANCASTER.

MANCHESTER DISTRICT.

In the matter of the Companies Acts, 1862, 1867, and 1877, and in the matter of the Court of Chancery of Lancaster Acts, 1850 and 1854, and in the matter of Bouck and Co., Limited.

TO BE SOLD BY TENDER, in one Lot, the Lands, Works, Plant, and Stocks of Bouck and Company, Limited, at Newton Heath, near Manchester, and at Blackburn, both in the County of Lancaster, and the benefit of and liability to the current contracts.

The following are the particulars:—

FIRST.—AS TO THE NEWTON HEATH WORKS.

1. A plot of land fronting the Rochdale Canal and Varley Street, containing 5191 square yards or thereabouts, and held for the residue of a term of 99 years from the 18th of April, 1853, subject to two yearly chief rents of £62 and £111 0s. 8d., and to the covenants, conditions, and agreements affecting the same.

2. A plot of land fronting the Rochdale Canal and Vickers Street, containing 1096 square yards or thereabouts, and held for the residue of a term of 99 years from the 30th of December, 1850, subject to two yearly chief rents of £6 17s. and £29 13s. 8d., and to the covenants, conditions, and agreements affecting the same.

3. A plot of land fronting Vickers Street, Varley Street, and the Rochdale Canal, containing 3560 square yards or thereabouts, and held for the residue of a term of 999 years from the 18th of July, 1862, subject to two yearly rents of £59 6s. 8d. and £59 6s. 8d., and to the covenants, conditions, and agreements affecting the same.

4. A plot of land fronting James Street and Vickers Street, containing 2096 square yards or thereabouts, and held for the residue of a term of 99 years from the 8th of June, 1857, except the last ten days thereof, subject to a yearly chief rent of £52 8s. 4d., and to the covenants, conditions, and agreements affecting the same.

The buildings, boilers, plant, and stock at these works consist of the following, namely:—

Tar Department.

Two brick-covered Wells, capable of holding respectively 300 tons and 100 tons of tar or thereabouts, with three ram-pumps, suction and delivery pipes from the wells to the stills. 18 wrought-iron Tar Stills, capable of distilling 400 tons of tar or thereabouts per week. Six wrought-iron 8 tons Anthracine Stills, with Cameron pump for removing products attached (which stills respectively have condensers, receivers, and connection-pipes to the wells). 10 elevated wrought-iron Storeage-tanks, capable of holding 80,000 to 90,000 gallons of crude products or thereabouts, with taps and delivery-pipes. A large iron Pitch Shed, with corrugated iron roof, and a brick-built Pitch House, capable of cooling 300 tons of pitch or thereabouts per week. One brick-built Anthracine Shed, containing cooling and storeage-tanks, four filter presses, two hydraulic presses with pumps and fittings, together with a 4-in. Cameron pump for pumping anthracine oils, with piping and fittings attached. Two brick Creosote Wells, capable of holding respectively 170,000 gallons and 1000 gallons or thereabouts, with ram-pump, suction and delivery pipes. Nine Naphtha-rectifying Stills, total capacity of 10,200 gallons or thereabouts, with small vertical engine. Four Ram-pumps, for charging these stills, together with condensers, receivers, and fittings. Two wrought-iron horizontal Reception Agitators, capacity 3000 gallons or thereabouts, with small vertical engine and driving-gear attached. Three wrought-iron Storeage-tanks, capable of holding 4000 gallons of rectified naphthas or thereabouts. Carbolic Acid Plant, comprising two cisterns for agitation, capacity 1000 gallons each or thereabouts, with neutralizing-tank. Two Cameron Air-pumps, with suction and delivery pipes and fittings. Four Ram-pumps and a vertical engine with pumps attached, for lifting water for condensing purposes, with suction and delivery pipes, taps, and fittings. One 12-in. Cameron Pump for discharging tar and liquor from the canal boats, with pipes, taps, and fittings.

Sulphuric Acid Department.

One Sulphuric Acid Chamber, with brimstone furnaces and coke towers, capable of producing 8 tons of acid or thereabouts per day, with one boiling-down pan. Sulphate of Ammonia Plant, with horizontal boiler and tower, capable of working 120 tons of liquor or thereabouts per week. Two wrought-iron Liquor Ammonia Stills, total capacity 8 tons or thereabouts, with ram-pump, purifiers, condensers, and receivers.

Sulphate of Zinc Department.

A number of lead-lined Neutralizing Tanks, with cooling tanks, capable of producing 5 tons or thereabouts per week.

Flour of Sulphur Department.

Four cast-iron Pots, with brick chambers and connections, capable of producing 2 tons of flour of sulphur or thereabouts per week.

Nitric Acid Department.

Six cast-iron Nitric Acid Cylinders, 72 jars and connections.

Nitrate of Lead Department.

Two Stone Mixers, 32 Crystallizing Stones, 16 Earthenware Evaporating Mugs complete.

Boilers, &c.

Three Horizontal Two-Flued Galloway Tube Steam Boilers of the following dimensions—viz., one of 7 ft. diameter by 26 ft. in length; one of 7 ft. diameter by 28 ft. in length, and the remaining one 7 ft. diameter by 24 ft. in length. One small Horizontal Two-Flued Steam Boiler, diameter 7 ft. by 14 ft. in length (all of which boilers have four, five, and six cast-iron flange-pipe connections running through the works). Seven Canal Boats, two Cart Horses and Gearing, three Box Carts, three Lurries, Boiler, Bogie and Float. 36 Tar Barrels. Wheelwright and Joiners Shop. Smithy, with anvil and blacksmith's tools. One Laboratory. Two Offices, and small Office and Store-Room in pitch yard. Watchman's House. One Cart-Weighing Machine, with fittings, and Lodge. Six Platform Weighing Machines. One round brick Chimney, 65 yards high, 80 ft. feathered.

Stocks at these Works.

Raw Materials and Products.—Nitre Cake—Carbolic Acid—Litharge—Nitrate Lead—Flour Sulphur—Sulphate Copper—Sulphate Ammonia—Sundry Drysalteries—Brown Vitriol—Anthracine—Anthracine Oils—Caustic Soda—Copper Precipitate—Rectified Benzole—Naphthas—Packages—Pitch—Nitrate Soda—Tar—Ammonia Water—Crude Naphtha.

SECOND.—AS TO THE BLACKBURN WORKS.

A plot of land at Further Gate, in Blackburn, fronting Forest Street and adjoining the Leeds and Liverpool Canal, containing 4070 superficial square yards or thereabouts, and held for the residue of a term of 21 years from the 1st of October, 1869, subject to a yearly rent of £42 7s. 11d., and to the covenants, conditions, and agreements affecting the same.

The buildings and plant at these works consist of the following:—

A range of brick-built Sheds, including office, store-room, naphtha-rectifying house, and a range of brick-built sheds covering sulphate of ammonia plant and anthracine filtering room.

One square brick Chimney, about 30 yards high.

One brick-built Anthracine Oil Well, capable of holding 200 tons or thereabouts, with suction and delivery pipes attached.

Three brick-built Anthracine Oil Wells, two uncovered and one covered, total capacity 10,000 gallons or thereabouts, with suction and delivery pipes attached to each.

One brick-built Creosote Well (covered), capable of holding 76,000 gallons or thereabouts, with delivery and suction pipes.

Two wrought-iron Tar Stills, capable of working 70 tons of tar or thereabouts per week, with wrought-iron condenser, tanks, worms, and receivers to each, together with connection pipes to well.

One damaged cast-iron Still, capable of holding 18 tons or thereabouts, with worm, condenser, tank, and connections.

Two wrought-iron Ammonia Stills, total capacity 20 tons or thereabouts, with nozzles, agitators, delivery and discharging pipes, together with lead-lined fishing-box, drainer, and two lead-lined sulphuric acid tanks.

One Naphtha-rectifying Still, capable of working 1200 gallons or thereabouts, with lead worm condenser.

Four wrought-iron Storeage-tanks, total capacity 9500 gallons or thereabouts, with delivery and discharge pipes.

Anthracine Plant, with hydraulic press, range of filter bags and wooden troughs, together with delivery pipe connections.

Platform Weighing Machine.

One 2-flued Steam Boiler of about 20 nominal horse power, with mountings and steam connections through yard.

One Vertical Engine, working by shaft and eccentrics; two small Water-Rams; and three Ram-Pumps for tar and liquor, with taps, pipes, and connections to stills and storetanks.

One 4-in. Cameron Pump, for water, with fittings.

Two wrought-iron Pitch Coolers, one 33 ft. long by 5 ft. wide by 3 ft. 6 in. deep, and one 57 ft. long by 5 ft. wide by 3 ft. 6 in. deep.

Pitch Bay, lined with flags, capable of holding 30 tons of pitch (or thereabouts. Seven Tar Barrels, one Lurry, two Carts, two Railway Waggons.

Stores at these Works.

Raw Materials and Products.—Tar—Anthracine Oil—Pitch—Ammonia Water—Sulphate of Ammonia—Anthracine—Crude Naphtha and Light Oil.

The purchaser will be required to take all such quantities of the stocks and stores, both at the Newton Heath and Blackburn Works, as may be ascertained to be on the Company's Works respectively on the date fixed for the completion of the purchase, at certain prices, of which a schedule can be seen at the Offices of the Official Liquidator on any day prior to September 19, 1879.

The purchaser will also be required to take over and complete the various buying and selling contracts respectively, which have been entered into by, or on behalf of, or with the Company, and which are still partially unperformed.

Copies of these contracts, together with an estimate of the extent to which they have been severally performed, may be seen at the Offices of the Official Liquidator, on any day prior to the said 19th of September, 1879.

Sealed tenders, endorsed "Tender for Bouck and Company's Property, Limited," and addressed to Mr. Ebenezer Adamson, 25, Booth Street, Manchester, will be received at his Office up to Twelve at noon, on Friday, the 19th day of September, 1879.

The vendor does not bind himself to accept the highest or any tender.

Cards to view, copies of the contracts, and a print of the particulars, conditions of sale, and form of tender, with any other information, can be obtained at the Offices of the District Registrar, Cross Street Chambers, 78, Cross Street, Manchester; of the Official Liquidator, Mr. Ebenezer Adamson, 25, Booth Street, Manchester; or Messrs. Brett & Craven, Solicitors, 3, Kennedy Street, Manchester.

MESSRS. W. C. HOLMES AND CO., Engineers and Contractors for Gas-Works, beg to state that they have sold the whole of their old stock and machinery, and have taken larger and more commodious Works with new and improved machinery. They are enabled to supply all Gas Apparatus and Gasholders at lower prices than hitherto.

Address W. C. Holmes and Co. (late Whitestone Iron-Works), Tunbridge Iron-Works, Huddersfield.

MR. E. TIMMINS, Engineer and Contractor, Bridgewater Foundry, Runcorn, having Purchased the whole contents of the Whitestone Iron-Works, Huddersfield, till recently carried on by Mr. W. C. Holmes, has a large quantity of Gas-Works Plant, new and ready for delivery; consisting of Gasholders from 12 to 40 feet diameter, Purifiers with New Wood Grids, Centre-Valves, Syphons of all sizes, and Wrought Buckled, Retort Lids.

Parties about to extend their Gas-Works or erect same, may view, and purchase at low prices, as the whole is being cleared out for railway extensions.

Now ready, price 6d. and 1s.

THE

SOFTENING AND PURIFICATION OF WATER

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PART I. explains the application of the system to large or small supplies for Private Mansions, Schools, Colleges, Asylums, Hospitals, Public Institutions, &c. Price 6d.

PART II. treats of the application of the system to large supplies for Water-Works and for Manufacturing Purposes, Paper Mills, Breweries, Bleach Works, the Prevention of Incrustation in Steam Boilers, stationary or locomotive, &c. It also contains extracts from Tables of Analyses, and Notes on Water Supply, specially useful for reference in connection with the question of Water Softening and Purification. Price 1s.

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62, FLEET STREET, LONDON, E.C.

WET METERS

The Imperial Meter Company's
PATENT
COMPENSATING
WET METERS,

Are, from the nature of their construction, frictionless in working.

Will allow several inches variation in water-level without any variation from correct measurement.

Under ordinary conditions need watering only once or twice a year.

The best Meters for tropical climates.

Less liable to derangement by frost than any other Meters with compensating or self-adjusting arrangements.

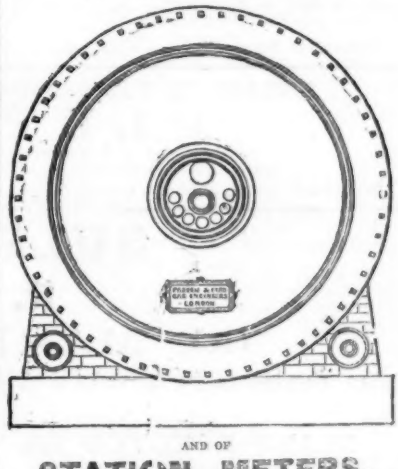
These improvements are, without extra charge, fitted into Street-Lamp Meters for Public Lighting.

APPLY TO THE

IMPERIAL METER CO.,

LIMITED,
(Formerly also Walter Ford, at Gray's Inn Road),
KING'S ROAD, ST. PANCRAS,
Manufacturers of
THE IMPROVED DRY METERS,

GOVERNORS,
STREET-LAMP REGULATORS,



AND OF

STATION METERS,
With or without Cast-Iron Stands.

WANTED, by Samuel Thompson & Co., Colliery Office, Lancaster, APPLICATION for PRICES from Gas Managers who are prepared to receive Tenders for GAS COAL or CANNEL.

John Leigh, Esq., M.R.C.S., F.C.S., &c., &c., in his analytical report of S. T. & Co.'s Coal, says: "It is remarkable for its purity, I have scarcely ever examined a Coal containing so small a quantity of ash, and when Cannel of the best description is scarce, it may well replace this material."

THE
SILICA FIRE-BRICK CO.,
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Near SHEFFIELD,

Manufacturers of THE ORIGINAL SILICA OR DINAS FIRE-BRICKS. Specially adapted for Gas-Retort Furnaces and for Siemens's Gas-Furnaces. Shipments promptly executed to London, Liverpool, Hull, Grimsby, &c.

BELGIAN CLAY RETORTS.

J. SUGG and CO., late ALBERT KELLER, GHENT.—The removal of the import duties on Earthenware permitting the entry of Clay Retorts into England, Messrs. Sugg, of Ghent, beg to draw the attention of the Gas Companies of London, and other Cities, to the very superior quality of the RETORTS manufactured by them. They can be made of any size, in one piece, and of any form. The price will be in proportion to the weight, and very moderate in comparison to their value.

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The Subscriber is prepared to contract for the supply of all the principal SCOTCH CANNEL COALS. Prices and Analyses of the various Coals will be forwarded on application.

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Established 1840.

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FIRE-BRICK AND TILE MERCHANTS,
Wholesale and for Exportation,
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DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES, and FIRE-CLAY, and every Article suitable for
GAS AND WATER WORKS.

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CONSULTING GAS ENGINEER
AND
CANNEL COAL FACTOR,
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Plans and Estimates furnished; Gas-Works, Apparatus, Pipes, Machinery, Fire Goods, &c., supplied, or Attested and Shipped for Exportation.
GAS-WORKS TAKEN ON LEASE.

Mr. ROMANS has for upwards of 30 years been practically engaged in the Manufacture of Gas, and has, by extensive experiments, ascertained that by JUDICIOUS INTERMIXTURE of the lighter with the heavier gases, much of the rich Hydrocarbons CAN BE SAVED, which otherwise ARE LOST, during the process of manufacture. He is therefore enabled to give advice to those who favour him with their orders for Cannel, as to the class which will secure for their standard of illuminating power the HIGHEST ADVANTAGEOUS RESULTS.

ANALYSIS AND PRICES FORWARDED ON APPLICATION.

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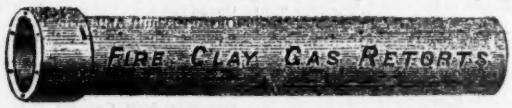
Manufacturers of FIRE-BRICKS, LUMPS, TILES,



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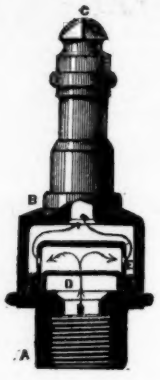

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The London Gas-Burner Company,
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ECONOMY IN THE PRODUCTION OF GAS, AND CARBON DEPOSIT ENTIRELY PREVENTED.
PLUTONIC CEMENT,
FOR JOINTING AND REPAIRING RETORTS AND OVENS *in* ACTION AND *out* OF ACTION.
A Pamphlet on the advantages of the above, with Modes of Application, References, Prices, &c., free by post, from the Sole Manufacturer,
WILLIAM RICHARDSON, Gas and Hydraulic Engineer, CHARLES HENRY STREET, and BISSELL STREET, BIRMINGHAM.

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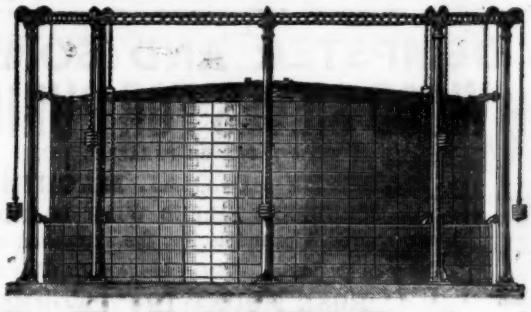

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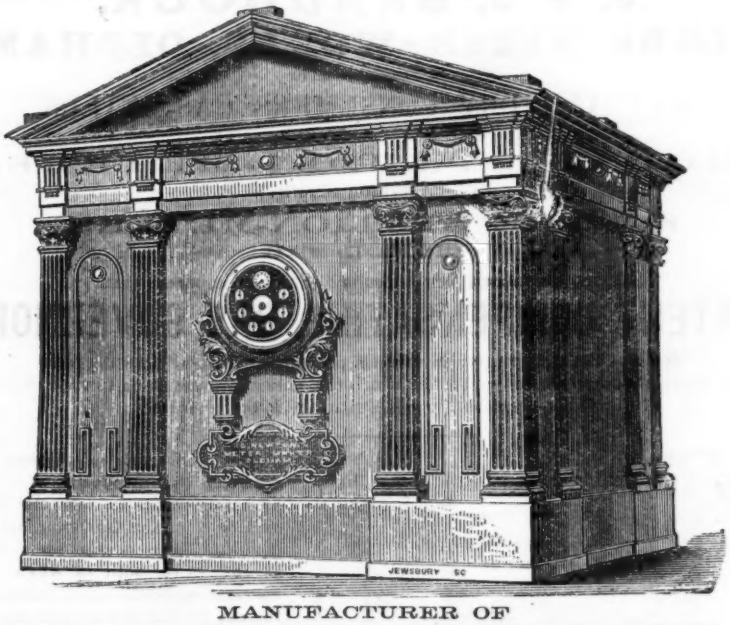

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Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.

Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

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Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS LUMPS, TILES, and every description of FIRE-BRICK.

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These Paints have been for many years extensively used in Her Majesty's Royal Dockyards, Woolwich Arsenal, the Shorncliffe and Curragh Camps, War Departments, and Colonies, and are largely supplied to Railway, Harbour, and GAS COMPANIES, Shipowners, Engineering Establishments, Railway Carriage and Wagon Works, and the Paint Trade generally. They are the BEST PROTECTORS of WOOD, CEMENT, and IRONWORK, even arresting corrosion after it has set in; and their base being oxide of iron, they are free from those properties which make lead paints so destructive to iron. They do not scale or blister, are not affected by great heat, and are the only Paints which will resist the effects of sulphuretted hydrogen. Their DURABILITY and covering properties have borne the test of A QUARTER OF A CENTURY'S PRACTICAL TRIAL.

The undermentioned colours—ground in best linseed oil, and requiring only to be thinned down for use in the ordinary way—are kept in stock:—

Torbay Brown.	Torbay Red.
Dart Green.	Slate.
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Light Blue.	Cream Colour.
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Carriage Red.	Dark Stone.
Light Lead.	Crystal Palace Blue.
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All other Colours made to order.

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A great variety of Colours ready mixed for the brush are also always kept in Stock, in 3 lb., 7 lb., 14 lb., and 28 lb. cans.

Prices and Testimonials on application.

LIVESEY'S PATENT WASHER.

This apparatus effects the most intimate contact between the liquor with which it is supplied and the gas passing through it, resulting in the complete removal of all particles of tar, increasing the ammonia strength of the scrubber and condenser liquor, and removing a large proportion of other impurities—notably, carbonic acid. The Washer is intended to work in conjunction with a scrubber. It occupies little space, and is inexpensive. It has been in successful constant use for nearly three years, does not become clogged with tar or corroded by the action of the liquor or gases, it gives three inches of pressure, and only needs a supply of liquor to keep it in regular action without any further attention.

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HENRY LYON (14 years Engineer and Manager of the largest of the Manchester Corporation Gas-Works) Mechanical and Consulting Gas Engineer, reports upon the condition and value of Gas-Works, supplies plans and specifications of all Apparatus appertaining to Gas-Works, and re-models existing Works.

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CONSULTING GAS ENGINEER,

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May be consulted on all matters connected with Valuations, Arbitrations, and Parliamentary Applications connected with Gas-Works. Having been engaged on extensive Arbitration Cases, which, combined with his experience in Construction and Contracting, his knowledge of Engineering and Valuations is both extensive and reliable.

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Accounts Analyzed and Statistics Prepared for Parliamentary Proceedings, Arbitrations, &c.

The Forms of Account, which have been specially designed by Mr. Lass to meet the requirements of the Gas-Works Clauses Amendment Act, 1871, are now in use by many Gas Companies, Corporations, and Local Boards.

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PROPRIETORS OF THE

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Manufacturers of all Descriptions of

BEST STOURBRIDGE FIRE-BRICKS, LUMPS, AND CLAY RETORTS

Of all Dimensions for Gas-Works,

GLASS-HOUSE POTS & CRUCIBLES

ESTABLISHED 1836.

The Highest Award was obtained by H. & M., at the Philadelphia Exhibition, 1876, for Superior Quality of Manufacture. SILVER MEDAL, PARIS, 1878.

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F. SUTTON & CO., Norwich, are now prepared to Supply a Set of Apparatus with Standard Test Solutions for the rapid and accurate analysis of Gas Liquor, which can be used by any intelligent workman, so as to show the actual amount of Sulphate which can be got out of any sample of liquor in a few minutes, without any of the annoyance arising from saturation with acid, &c. Tables are also given, showing the quantity of acid of various strengths required for any given liquor, the accurate ounce-strength and percentage of pure ammonia, &c. Price of the set, with full direction and table (copyright), with materials sufficient for fifty analyses, £4 4s.

Post orders or cheques to be made payable to F. SUTTON AND CO., Manufacturing Chemists, NORWICH, who also supply every description of Standard Solutions for Volumetric Analysis of Waters, Beers, Manures, &c., of guaranteed accuracy.

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CAST-IRON GAS AND WATER PIPES.

DELIVERY F.O.B., GLASGOW.

Prices on application.

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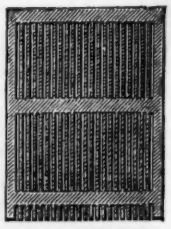

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WITH TAPER OR PARALLEL BARS,

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SCRUBBERS FILLED WITH BOARDS,

On our approved principle, for the extraction of Ammonia.

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GAS *v.* ELECTRIC LIGHT.

WIGHAM'S PATENT GAS-BURNERS

FOR

STREET LIGHTING, &c., WHICH REQUIRE NO GLASS CHIMNEY.

Speaking of these burners, erected on the Thames Embankment, the Governor of The Gaslight and Coke Company, at the half-yearly meeting, Aug. 15, 1879, says:

"ANY gentleman who may wish to see the light, may do so at the foot of Westminster Bridge, where it is in direct contiguity with the electric light, so that he will be able to judge for himself. There is a light there that completely excels the electric light in the intensity of its illumination, and in the scope of its diffusion. The lamps on Westminster Bridge are some of Mr. Wigham's."

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J. & J. BRADDOCK,

GLOBE METER-WORKS, OLDHAM,

MANUFACTURERS OF

WET AND DRY CONSUMERS GAS-METERS,

OF THE HIGHEST EXCELLENCE ONLY;

ROUND STATION-METERS,

ON CAST-IRON STANDS;

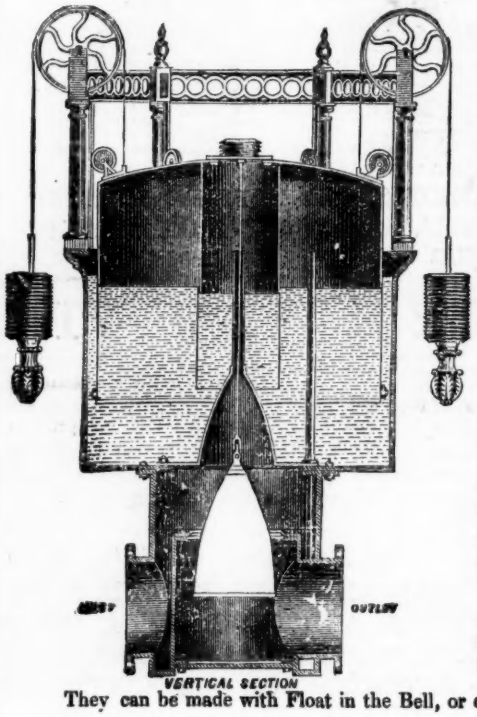
SQUARE STATION-METERS,

WITH PLANED JOINTS.

Messrs. BRADDOCK beg to submit to Gas Engineers their

PATENT COMPENSATING GAS GOVERNOR,

Which is designed to give an uniform pressure at the Outlet to the Main at all draughts up to the full quantities which the Governors are made to control, such outlet pressure being less than the initial pressure.

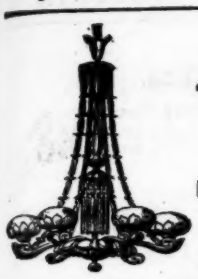


The uniformity of pressure is obtained by introducing a compensating chamber into the Bell or Holder of the Governor, which compensator is of the same area as the valve, both of which are operated on by the initial pressure, thereby placing the valve in equilibrium, no matter what the initial pressure may be. The action on the Bell is by the Gas passing along a pipe from the outlet, and the pressure is regulated by weights in connexion with the Bell as required.

From the sectional elevation attached hereto, it will be seen that only the Gas required to operate the Bell comes in contact with the water of the tank, which water will remain comparatively sweet and free from odour. That in case of accident to the Bell, no more Gas can escape than would pass up the pipe covering the valve-rod and Bell supply-pipe.

These Governors have been made and sent out of various sizes for from 2 to 30-inch Mains, and give most satisfactory results.

They can be made with Float in the Bell, or counterpoise as per section.



F. & C. OSLER,

45, OXFORD STREET, LONDON, W.

MANUFACTORY AND SHOW-ROOMS:

BROAD STREET, BIRMINGHAM.

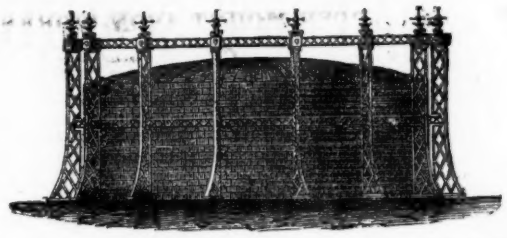
ESTABLISHED 1807.

MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS,

WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.



THE HORSELEY COMPANY,

LIMITED,

TIPTON, STAFFORDSHIRE.

LONDON OFFICE:

6, WESTMINSTER CHAMBERS, VICTORIA STREET,

GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED, LAMP-POSTS, PIPES,

AND ALL REQUISITES FOR EITHER

GAS OR WATER WORKS;

ALSO

MAKERS OF ROOFS, BRIDGES, &c.

S. OWENS & CO.,

HYDRAULIC, GAS, AND GNERAL ENGINEERS,

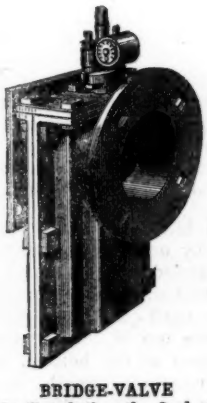
WHITEFRIARS STREET, LONDON, E.C.

Sole Manufacturers of MANN & OWENS'

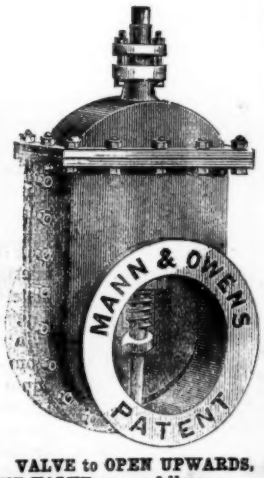
PATENT SCREW & CAM GAS-VALVE,

Protected by Royal Letters Patent in England, France, Belgium, & the United States of America.

VALVE to OPEN DOWNWARDS.



BRIDGE-VALVE
for Regulating the Seal of Hydraulic Mains.



VALVE to OPEN UPWARDS.

The SPECIAL ADVANTAGES of MANN AND OWENS' PATENT VALVE are as follows:—

1. Its non-liability to become set fast through varying temperature or from the deposit from crude gas. 2. It is made absolutely gas-tight by the simple action of a screw and cam. 3. Inconvenience through the breakage of springs or wedges setting fast cannot arise. 4. The face of the Valve is scraped and cleaned of any solid matter at each operation of opening or closing.

The Valve can be had to work either in a Vertical or Horizontal position.

Every Valve is carefully tested under pressure, and warranted perfectly sound and gas-tight.

INSTRUCTIONS FOR ORDERING.

State whether required for above or below ground, if Double Flange or Socket and Spigot Valves are wanted, or with loose Flanged Socket and Spigot pieces.

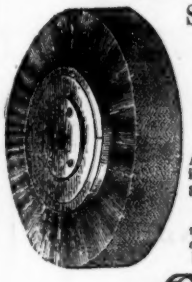
The Prices include Indicators to show extent to which Valve is open.

Also makers of PILLAR-VALVES, SELF-ACTING BYE-PASS VALVES, OUTSIDE RACK AND PINION VALVES, HYDRAULIC-MAIN VALVES, DISC-VALVES, &c.

Every description of Pumping Apparatus, Hydraulic Lifts, &c., suitable for use in Gas-Works, made to order.

PRICES, SIZES, AND FULL PARTICULARS, WITH COMPLETE ILLUSTRATED CATALOGUE, FURNISHED ON APPLICATION.

Selig, Sonnenthal & Co.,



STEEL CASTING BRUSHES

FOR HAND.

Circular Casting Brushes for Lathes and Brooms,

Admirably adapted for Cleaning Hot Castings, &c., and for general use in foundries, gas-works, chemical works, &c.

As Supplied to the Government and the leading English and Foreign Engineers, Gas-Works, &c.

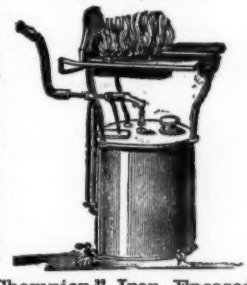
Broom.

No. 1, Brush,	3in.	wire,	2	rows,	15s.	dozen.	
,, 2, ,,	5	,,	round,		23s. 6d.	,,	
,, 3, ,,	3	,,	4	rows,	23s. 6d.	,,	
,, 4, ,,	2	,,	4	,,	21s.	,,	
,, 5, ,,	3	,,	4	,,	22s. 6d.	,,	
,, 6, Broom,	12in.	block,	7in.	wire,	4	rows,	72s. per dozen.
,, 7, ,,	16	,,	7	,,	4	,,	90s. ,,
,, 8, ,,	upright,		7	,,	2	,,	48s. ,,
,, 9, ,,	12in.	block,	7	,,	10	,,	180s. ,,
,, 10, ,,	16	,,	7	,,	10	,,	228s. ,,
,, 11, ,,	12	,,	4	,,	4	,,	56s. ,,
,, 12, ,,	16	,,	4	,,	4	,,	72s. ,,
,, 13, ,,	12	,,	4	,,	10	,,	120s. ,,
,, 14, ,,	16	,,	4	,,	10	,,	180s. ,,

							each
Wheel,	6in.	dia.,	2¼	wide,	1¼	wire projects,	5 rows, ⅝ hole, 10s.
,, 8	,,	2¼	,,	1¼	,,	6 ,,	⅝ ,, 13s.
,, 10	,,	3	,,	2¼	,,	6 ,,	⅝ ,, 21s.
,, 13	,,	3½	,,	3½	,,	7 ,,	1 23s. 6d.
,, 14	,,	3½	,,	3½	,,	7 ,,	1 30s.
,, 18	,,	4	,,	3½	,,	8 ,,	1¼ 63s. 6d.

The "Champion" Iron Encased Forges.

Are specially suited for General Out-door Purposes, and will be found suitable to any climate.



PRICES.

SINGLE BLAST.	£ s.
No. 1, 8 in. bellows, to heat ¾ in. sq. in 2 min.	6 4
2, 10 in. bellows, to heat 1¼ in. sq. in 2 min.	7 10
3, 12 in. bellows, to heat 2 in. sq. in 2 min.	9 13

DOUBLE BLAST.	£ s.
No. 4, 8 in. bellows, to heat 1 1-8th in. sq. in 2 min	10 8
5, 10 in. bellows, to heat 2 in. sq. in 2 min.	13 8
6, 12 in. bellows, to heat 3 in. sq. in 2 min.	16 16
7, 14 in. bellows, to heat 3¾ in. sq. in 2 min.	21 0

The "Champion" Iron Encased Forge,

With Vice-Drilling Frame on stand complete.

No. 10, Double Blast, 10 in. bellows, to heat 2 in. sq. in 2 min., £15.

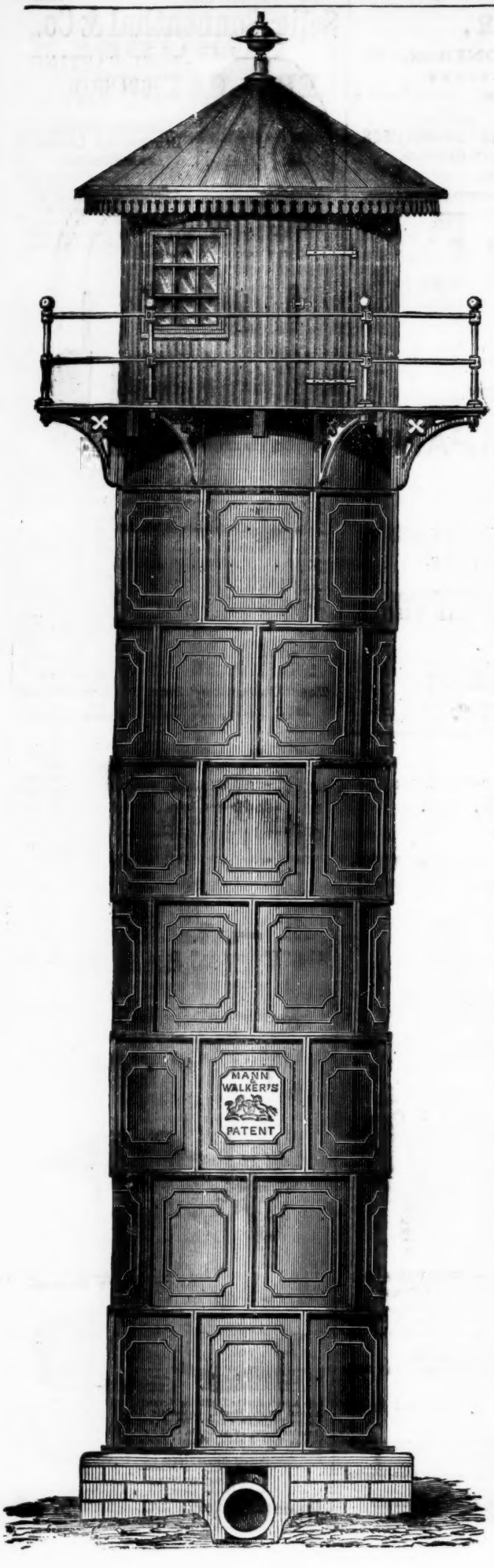
No. 11, Double Blast, 12 in. bellows, to heat 3 in. sq. in 2 min., £18.

No. 12, Double Blast, 14 in. bellows, to heat 3¾ in. sq. in 2 min., £22 10s.

Sole Agents for the Lightning Screwing and Drilling Machines, Helical Pulley Blocks, Automatic Revolving Scrapers, Earth Borers, Tanite Co.'s Emery Wheels and Emery Grinders, Lathes, Genuine Morse Twist Drills, Cushman's Drill and Lathe Chucks, Patent Belt Screws, Patent Safety Belt Shippers, Casting Brushes, Shaped Diamonds, and a great variety of other Machinery always kept in stock or in progress.

LAMBETH HILL,

Queen Victoria St., London, E.C.



C. & W. WALKER,
8, FINSBURY CIRCUS,
LONDON, E.C.

MANN & WALKERS' PATENT SCRUBBER.

By Letters Patent in Great Britain, Europe, and the United States of America.

By some important improvements recently patented, the purifying power of these Scrubbers has been much increased, and a stronger ammoniacal solution obtained, which is found to absorb a large portion of the carbonic acid contained in gas, effecting an important saving in money and labour in the lime purifiers, and where oxide only is used, the increase in the illuminating power of the gas obtained by these Scrubbers is shown in a remarkable degree, in consequence of the large quantity of carbonic acid removed from the gas.

It is to be particularly noted that the im-portant results of these Scrubbers do not depend upon the machinery alone. The entire internal construction of the Scrubber bears an almost equally important part. For this reason, where it is desirable to convert existing Scrubbers, whose dimensions happen to be suitable, the work commences by ripping out the whole of the interior of the shell, and beginning the internal construction *de novo* from bottom to top.

Fifty million cubic feet of gas per 24 hours are purified from ammonia by these Patent Scrubbers in a winter's day in the gas-works of London, where the purity of gas supply is the highest in the world, under the chemical restrictions of the Board of Trade.

Generally, wherever a high standard of purification is maintained in the chief cities and towns of the British Provinces and of Europe, these Scrubbers have become established.

By their use the department of purification from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

Foul Gas, properly condensed, entering the inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

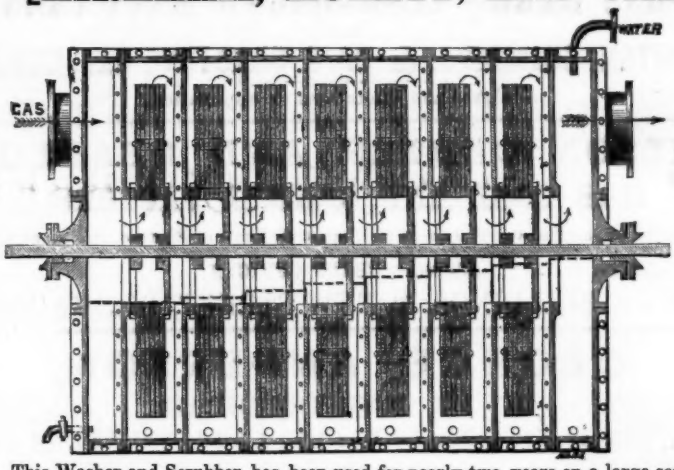
They contain their own engine power, re-quiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

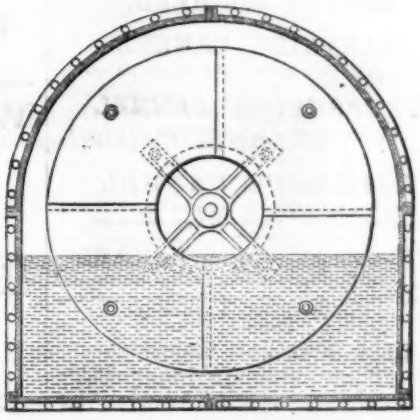
Applications relating to dimensions and prices should be addressed to us, C. AND W. WALKER, 8, FINSBURY CIRCUS, LONDON, E.C., or to Mr. WILLIAM MANN, late Superintendent of the Chartered Gas-Works, BLACKFRIARS, LONDON; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

THE

"STANDARD" WASHER & SCRUBBER.

[KIRKHAM, HULETT, AND CHANDLER'S PATENT.]





This Washer and Scrubber has been used for nearly two years on a large scale at the Works of The Gaslight and Coke Company, Bromley-by-Bow, at which station there are now several in operation and in course of construction. There is also one in use at the Pancras Station, King's Cross, of the same Company, which is purifying 1,500,000 cubic feet of gas per day. At the Gas-Works of the Corporation of Leeds, a large one has been erected, which is giving complete satisfaction. The Special Merits of this Washer are as follows:—

That it is a very effective Condenser, so that it is not absolutely necessary to reduce the temperature of the gas to 60°, or thereabouts, to make the Washer effective. That the distribution of the liquor is made with unerring regularity. That it occupies very small space, so that it can be, at little expense, effectually protected from extreme changes of the weather. That the considerable expense of Coke or Wood, or other Scrubbing Material, is entirely saved, and that the great nuisance and cost of from time to time replacing the Scrubbing Material is avoided. That, by the revolution of the discs, the quantity of water carried up by them, and tending continuously to fall, exposes a very large amount of fresh wetted surface to contact with the gas. That it is particularly adapted for Gas-Works where Sulphate of Ammonia is manufactured. That it is much cheaper than any other Scrubber that will do the same amount of work effectually. That it is the only Washer suitable for purifying Gas from all its impurities by solution. That it works with a minimum of pressure. That it takes out every trace of Ammonia from the Gas in once traversing the machine. That it requires very little outlay for foundations.

The following Testimonials show the opinion of eminent Engineers as to the capabilities of the Washer:—

D. HULETT, Esq. *The Gaslight and Coke Company, Bromley-by-Bow, May 3, 1877.*

Dear Sir,—In answer to your inquiries respecting the results of the working of your Patent Washer, I beg to state that I find it a very efficient machine. I have had it in operation for some time, and passed gas through it continuously at the rate of 100,000 cubic feet per hour, and obtained from it 11 gallons of 10 oz. liquor per ton of coal carbonized—results which appear to me very satisfactory for so small a Washer. It works very smoothly, taking but little power, and giving no pressure. I have it still in operation, and am perfectly satisfied with its working.

I am, dear Sir, yours truly, (Signed) W. B. WRIGHT.

MESSRS. KIRKHAM, HULETT, and CHANDLER. *The Leeds Corporation Gas-Works, York Street, Leeds, Dec. 6, 1878.*

Gentlemen,—The Scrubber-Washer erected by you at these works, and which has been in use for six months, has proved to be, so far as we have been able to test it, thoroughly efficient. We are at present making 32,000 feet of gas per hour, and are entirely dependent on this apparatus for the removal of Ammonia, and the **Gas is perfectly free from that impurity in the sixth chamber**, so that four chambers remain to deal with an increasing make of gas. Owing to insufficient condensers, the gas was in the summer admitted to the Scrubber at a temperature of 70°, but was reduced therein to 61°, or that of the atmosphere. The volutes are driven at the rate of four revolutions per minute, and, working at that speed, there is not the slightest difference between the inlet and the outlet pressure. Clean water supplied at the rate of 10 gallons per ton of coal carbonized is converted into liquor of from 10 oz. to 13 oz. strength **in once traversing the vessel.** The apparatus is extremely simple and compact, occupies but little space, and requires no foundation. I shall be surprised if it does not eventually become extremely popular.

I am, Gentlemen, yours faithfully, (Signed) HENRY WOODALL, Engineer.

MESSRS. KIRKHAM, HULETT, and CHANDLER. *The Gaslight and Coke Company, York Road, King's Cross, Jan. 14, 1879.*

Gentlemen,—In reply to your inquiry, I am pleased to say, the Washer which was put in action at this station in October last has quite fulfilled my expectations, as it confirms the experiments I made in May last with the smaller machine. Working at four revolutions per minute, **it takes out every particle of Ammonia**, while purifying more Gas than it was intended to do. I enclose particulars of a fortnight's working during our heaviest make, by which you will see that it yields the full quantity and strength of liquor, and works with little pressure. I am therefore quite satisfied with the machine, and trust it may meet with the success it deserves.—I remain, &c. (Signed) JOHN CLARK.

The following Table shows the results of the working of one of these Washers, lately erected to purify 60,000 feet of Gas per Hour, at the St. Pancras Station of The Gaslight and Coke Company:—

1879.	Nos. of the Divisions and Strength of Liquor in each.										Water used per Ton of Coals.	Gas Purified per Hour, Cubic Feet.	Ammonia on Outlet.	Temperature.			Pressures.		Revolutions per Minute.
	1	2	3	4	5	6	7	8	9	10				Inlet.	Outlet.	Atmosphere.	Inlet, Inches.	Outlet, Inches.	
	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.									
January 1	8½	6¾	5	3½	2½	1½	¾	¼	0	0	10 Gallons.	52,000	Nil.	77°	73°	48°	24	23	7½
,, 2	8½	7	6	4½	3½	2¼	1½	¾	¼	0	10 ,,	57,000	Nil.	73°	66°	32°	21¾	20½	4
,, 3	9½	8	6	3¾	3	2½	1½	¾	¼	0	10 ,,	60,000	Nil.	75°	68°	40°	23½	22	4
,, 4	9½	7¾	6¼	4¼	3¼	2¼	1½	¾	¼	0	10 ,,	65,000	Nil.	74°	68°	33°	24	23½	5
,, 5	9½	7	6	4	3	2½	1¼	1	¼	0	10 ,,	34,000	Nil.	77°	68°	35°	14½	14	3
,, 6	9½	7½	6½	4½	3	2¼	1½	1	¼	0	10 ,,	63,000	Nil.	72°	66°	27°	24	22½	4½
,, 7	11	9	7	5½	4¾	3	1¾	1½	¼	0	10 ,,	59,000	Nil.	74°	66°	31°	25	23½	5
,, 8	9½	7½	6	4½	3	2	1	¼	¼	0	10 ,,	78,000	Nil.	73°	61°	31°	28	26¼	4½
,, 9	11	9	7	5	3½	2½	1½	1	¼	0	10 ,,	62,000	Nil.	74°	67°	33°	27½	25½	5
,, 10	10½	8½	6¾	5	3½	2½	1½	1	¼	0	10 ,,	66,000	Nil.	76°	64°	28°	28½	27	5
,, 11	12½	10	7¾	5¾	4¼	3¼	1¾	1¼	¼	0	10 ,,	61,000	Nil.	78°	64°	27°	26½	25½	5
,, 12	11	8¾	6¾	—	—	—	1¼	¾	¼	0	10 ,,	39,000	Nil.	74°	64°	27°	26½	25½	5
,, 13	13	10½	8¼	6	4¾	3½	2	1½	¼	0	10 ,,	78,000	Nil.	73°	65°	42°	28	26	5

MESSRS. KIRKHAM, HULETT, and CHANDLER. *Corporation of Birmingham, Gas Department, Saltley Works, May 23, 1879.*

Gentlemen,—I beg to enclose you a copy of the results of the tests which, by the kind permission of the Engineer, Mr. Clark, I made on the 6th of March last, of the working of one of your "Standard" Washers and Scrubbers at the St. Pancras Station of The Gaslight and Coke Company, and I am of opinion that, for an apparatus occupying so small a space, they are exceedingly satisfactory.—Yours truly, HENRY HACK, Engineer.

Working Results obtained from KIRKHAM, HULETT, *and* CHANDLER'S *Patent "Standard" Washer and Scrubber at the St. Pancras Station of The Gaslight and Coke Company, London, March 6, 1879.*

Gas passing per Hour, Cubic Feet.	—	Impurities in Gas per 100 Cubic Feet.			Temperature.		Pressure in Inches.	Revolution of Apparatus per Minute.	—	No. of Divisions and Strength of Liquor.										Water Used during Experiment. Gallons.
		SH_2	CO_2.	Grains. NH_3.	Washer.	Air.				—	—	—	—	—	—	—	—	—	—	
64,000	Inlet	2·00	2·00	158·8	72	57	21	4½	Twaddel deg. at 60°	5·3	4·9	2·85	2·35	1·7	1·05	0·6	0·3	0·15	0·1	53
	Outlet	1·50	1·50	0·8	68	57	20		And, ounces. . .	11·0	8·4	6·3	4·5	2·7	1·7	1·3	0·7	0·3	—	

WASHER-SCRUBBERS OF THIS PATENT ARE IN COURSE OF CONSTRUCTION FOR BECKTON, BRADFORD, GREENWICH, WOOLWICH, AND SEVERAL OTHER GAS-WORKS.

For further particulars and testimonials, address

Messrs. KIRKHAM & HERSEY, GAS ENGINEERS, 21, ABINGDON STREET, WESTMINSTER.

ROBERT MARSHALL,

CANNEL COAL MERCHANT,

198, ST. VINCENT STREET, GLASGOW.

SHOTT'S BOGHEAD.

HARTHILL CANNEL

Yields 14,920 cubic feet of 40·92-candle gas per ton.

THRASHBUSH CANNEL

12,530 cubic feet of 40·22-candle gas per ton, and 9 cwts. of good coke.

LOTHIAN'S CANNEL

Yields 12,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

MUIRKIRK, No. 1, CANNEL

Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash. This cannel is almost free from sulphur.

OLD WEMYSS CANNEL

Yields 13,320 cubic feet of 32·5-candle gas per ton.

Prices and full analyses on application at above address, or from WEDDERSPOON, FERGUSSON AND CO., 21, Lime Street, LONDON, E.C.

GAS COAL.

THE MIRFIELD COAL COMPANY are supplying GAS COAL of the best quality on trucks at their siding. This Coal contains 10 per cent. of Cannel, and, as analyzed by Mr. James Paterson, of Warrington, yields 12,600 *cubic feet of* 16·67 *candle gas, with* 1430 *lbs. of good Coke, per ton.* Ash in Coke, 1·88.

Apply to the MIRFIELD COLLIERY, Mirfield, NORMANTON.
London Agents: SMITH BROS., 38, THROGMORTON ST., E.C.

HEBBURN MAIN GAS COAL.

This Coal is now highly approved of for gas making, and yields over 10,000 feet per ton of 15-candle gas, and about 14 cwt. coke.

For references and prices, either f. o. b. or by rail, apply to

W. RICHARDSON,

29, QUAYSIDE, NEWCASTLE-ON-TYNE.

GAS COAL.

THE Tawd Vale Colliery Company, Limited, are prepared to Contract for the Supply of their superior Arley and other GAS COALS, and to send samples to the order of Gas Engineers and others, or complete analysis on application. Shipped at Liverpool, Preston, Fleetwood, Garston, or Birkenhead.

Mr. James Paterson, C.E., F.G.S., in his analysis of T. V. Arley Coal, says: "Some parts merge into a semi-Cannel; Gas per ton, 10,300 cubic feet; illuminating power, 16·96 candles; coke of high quality, 1431 lbs. per ton."

Collieries, Skelmersdale, near Ormskirk; Offices, 5, New Hall, Old Hall Street, LIVERPOOL.

GAS COAL.

POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12¼ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

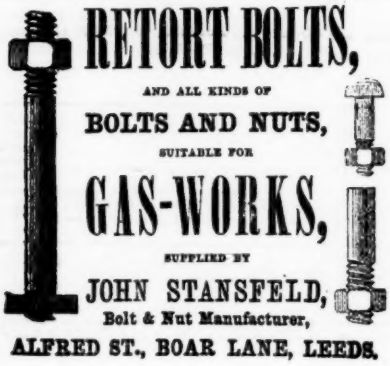
For further particulars, apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

M. BREMOND'S NAPHTHALINE PROCESS.

All negotiations respecting M. Brémond's patented process for preventing Deposits of

NAPHTHALINE

in Gas Main and Service Pipes should be addressed to Mr. W. H. BENNETT, 22, Great George Street, WESTMINSTER, S.W., or to M. BREMOND, Gas Engineer, Compania Madrilena de Alumbrado y Calefaccion por Gas, MADRID, who may be consulted upon all matters connected with the Gas Industry.



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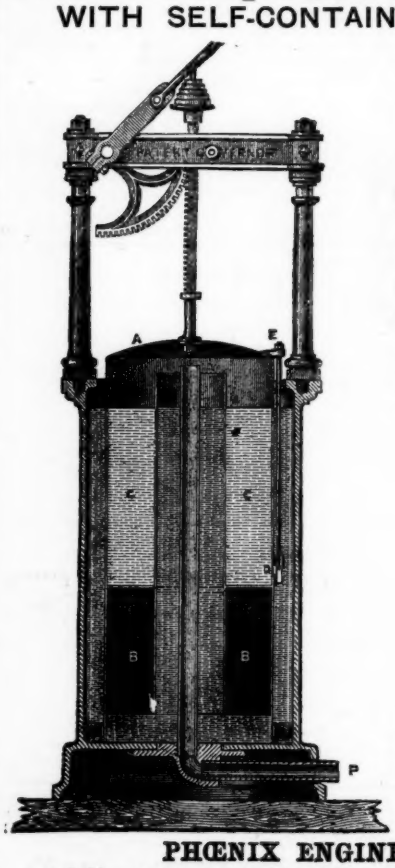
Patent Compensating Steam Governor,

WITH SELF-CONTAINED WATER-BALANCE.



This is the most efficient and perfect Governor yet made to control and regulate the speed of Engines and Exhausters according to the varying make of gas, and maintain a steady gauge, whether working level or with six inches of seal.

It is the only Governor that will effectually control Condensing and Compound Engines, especially when the Exhauster is on light work, and the Engine is large.

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G. W. and Co. make **special Steam Throttle Valves,** suitable for working with this Governor, and alter existing Throttle Valves to same plan.

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THE NEW GAS COOKER.

40 PER CENT. OF GAS SAVED.

No. A510 same as our **No. A152,**
BUT LINED WITH PATENT NON-CONDUCTOR.
Will Roast, Bake, and Fry, and with Three Burners for Boiling.

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Outside—30in. high, 20in. wide, 20in. deep.
Inside—19½in. „ 14in. „ 17in. „
Price . . . . . **£4 14s. 6d.**

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Is fitted with Roasting and Baking Oven and Four Burners for Boiling.

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Same as with Roasting and Baking Oven, a Broiler or Toaster, a Chop Griller, a Hot Water Boiler, and Three Burners for Boiling.
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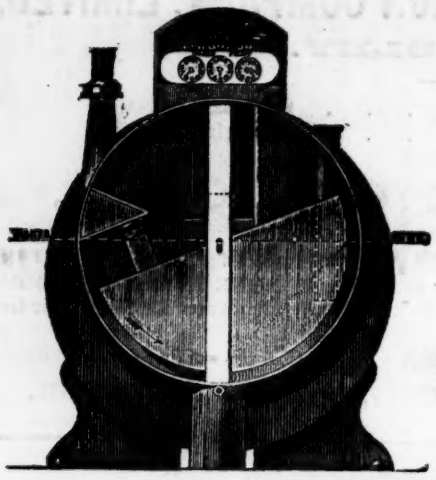

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"Unquestionably the best Water Gas-Meter now in use."—THOS. G. BARLOW, C.E.

Over 120,000 in action.

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METERS, BOXES, REGULATORS, AND ALL REQUISITES FOR PUBLIC LIGHTING.

TESTING APPARATUS for all purposes relating to Gas, &c.

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STATION-METERS, ALL SIZES, up to 15 feet Square, with PLANED JOINTS;

Experimental Meters, Photometers, Pressure-Gauges, Governors, Test Holders, &c., &c.

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IMPROVED HYDRAULIC CRANES,

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HYDRAULIC APPARATUS for Lifting and Lowering Purifier-Covers.

Sixteen recently erected at Beckton, applied to Covers 30 feet square.

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IN SUCCESSFUL OPERATION AT THE NEW WORKS OF THE NEWCASTLE AND GATESHEAD GAS COMPANY, AND IN COURSE OF ERECTION AT THE CARLISLE CORPORATION GAS-WORKS.

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